Food Manufacture

THE JOURNAL OF THE FOOD INDUSTRY

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The editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings whenever possible.

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Food Board's Report.

COPIES OF the Report of the Food Investigation Board for 1927 are now available. This report affords definite proof of the value to the food industry in general of the scientific work carried out by the Board. Examples of the subjects treated in the report are: The Transport of Chilled Beef; The Conditioning of Beef; The Freezing of Tissues; Research on Pork, Ham, and Bacon; Wastage in Fruit Commerce; Cold Storage Trials with Tomatoes; Fungal Diseases of Imported Fruits; Atmospheric Control in Fruit Storage; Properties of Gelatin; Fish Oils; Fish Meals.

Additional facilities for research are to be provided in the near future by the expansion of the Low Temperature Research Station at Cambridge and the erection of a station at East Malling for the study of the storage of fruit. The latter will include an experimental store capable of holding 100 tons of fruit, and being situated near the East Malling Horticultural Research Station, special facilities are available for examining the influence of the stock upon the keeping properties of apples. The effects of soil, climate, and variety have already been analysed—soil, for example, was found to modify keeping properties widely.

We are especially pleased to note that the Low Temperature Research Station has been equipped with a special laboratory to be devoted to fundamental work on canning.

Fish Research.

During the year under review the Fish Preservation Committee was discharged. On the other hand, a new committee, the Food Transport and Distribution Committee, has been set up to study the handling and transport of food from producer to consumer. The object of this is to find out how science can be best applied to lessen wastage, improve quality, and aid in the utilisation of by-products. Already one aspect of the problem has been tackled, namely, the transport of fish, and in particular, the possibilities of diminishing wastage by the application of mechanical refrigeration at sea. It is gratifying to note that preliminary experiments carried out in an Aberdeen steam trawler indicate that some method of chilling fish is a commercial possibility. Furthermore, it has been demonstrated that the chief cause of fish deterioration while aboard a vessel is bacteriological. This work is being followed by full-scale investigations in steam trawlers, and there is every indication that the money spent will be amply justified by results of direct and immediate application to the fish industry.

The amazing thing is that properly organised work of this character has not been commenced years ago; the necessity for it is so perfectly obvious. It is quite beyond our comprehension that any industry, and particularly this industry, should make a wry face when asked to lend a tiny fraction of its earnings to a body of men whose sole object, apart from a desire

to satisfy scientific curiosity, is to return the loan multiplied almost indefinitely. Probably not half the difficulty would be experienced in raising funds to dredge the Clyde for silver coins dropped from pleasure boats or to bore for fish oil in Turkey.

Fruit Research.

Research upon fruit is centred round two main practical issues, namely, (1) the forecasting of the storage life of the fruit from a knowledge of its physiological condition when gathered, and (2) the improvement of orchard practices with the object of producing fruit of the highest capacity to store and carry well.

Steady and satisfactory progress is being made, but there is much work of a fundamental character to be done before we can profess an intimate understanding of exactly what takes place during the process of ripening and of exactly how ripening is influenced by the atmospheric factors of temperature, composition, and humidity, and the orchard factors of soil and climate, either singly or combined. When we know that, we shall really understand something about storage.

Storage Temperature.

Temperature is at present the only environmental factor in the storage of fruit which the practical man is attempting to control. It is, however, becoming increasingly clear that for living products there exist certain critical temperatures below which they cannot be stored for any considerable length of time without depreciating in flavour and condition, or even actually breaking down and becoming inedible. The Food Investigation Board is concentrating an attack upon this question, and is trying to find out the effect of controllable orchard conditions and other factors upon the ability of fruits to withstand cold, or, better expressed, upon low-temperature tolerance.

Then there is the practical problem of obtaining uniformity of temperature throughout the mass of self-heating living material in a fruit or vegetable store.

Another line of research along which steady advance is being made is that which is concerned with the biological effects of carbon dioxide and oxygen under storage conditions, particularly in relation to low-temperature tolerance. It has been found that at storage temperatures low enough to cause low-temperature breakdown in fruit, control of atmospheric composition seems to be without useful effect. Above this critical temperature limit, however, carefully controlled reduction of the oxygen and increase of the carbon dioxide is extremely valuable in preserving and extending the storage life of the fruit.

Progress is also being made in the study of atmospheric humidity, its measurement and control, and its biological effects, including its effects upon fungal organisms responsible for decay.

Beef Research.

The Food Investigation Board has given in its report some important data relating to chilled beef and the conditioning of beef. It is pointed out that, strictly speaking, the description "chilled beef" should be applied only to meat absolutely free from ice. In the trade, however, meat is described as "chilled" if it is carried at or above a temperature of about 27° F., even though it may contain an appreciable amount of ice. There is little doubt that slightly frozen beef from Australia can be landed here in good condition, but further research will be required before an opinion can be expressed as to the possibility of carrying ice-free chilled beef over such a long journey. This question is an important one; ice-free chilled beef gives no drip, and hence retains its flavour; and it does not sweat so much when removed to ordinary temperatures, so that its "bloom" is retained and certain changes due to the action of water on the exposed fat are minimised.

It is interesting to note that the temperature at which ice crystals first form in beef depends upon many factors, including the breed and age of the animal, its condition of rigor, etc. The average value may be taken as approximately −1° C. (30·2° F.).

As regards the conditioning of beef, preliminary experiments have shown that there is in general a progressive increase in the tenderness of all joints hung at 41° F. (the temperature so far investigated); that the increase is less marked with the best quality meat—*e.g.*, loin from prime animals; that there are indications that certain coarse joints and, in any case, inferior quality carcases as a whole, are greatly improved by hanging; and that after seventeen days' hanging at 41° F. the meat is still perfectly sweet.

Pig Industry Problems.

Recently, the Food Investigation Board has instituted research into the transport and storage of pork, ham, and bacon, and into the manufacture of ham and bacon. We note with satisfaction that Dr. E. H. Callow, who has done excellent work in past years, has been put in charge of this department; at least, we make the assumption since his name heads this section of the report. A study of salt curing is at last under way. This is another example of research long overdue—years ago it seemed to us the obvious thing to be taken up without delay. We consider this subject of such vast importance to the

industry that we have published Dr. Callow's note on the theory of salt curing on another page.

Other lines of investigation now being followed up include the possibility of sending frozen bacon over from distant Dominions (which involves a research into the effects of the temperature of storage on bacon), and the use of frozen pork for the manufacture of hams and bacon.

Meat and Formalin.

A butcher and his assistant were recently fined rather heavily at Mortlake for treating meat with formalin. They bought a pint of formalin once every two months from a chemist, and they had used it to prevent the meat "going clammy" over the week-end. The butcher said he had eaten hundredweights of meat treated with the preservative, and had never troubled a doctor. Presumably he had also escaped "going clammy" until this affair came up.

What have the doctors to say about this? The *Lancet* remarks that it is possible that the majority of people could eat meat treated with formalin for years without obvious ill-effects, but there are many who, without being exactly invalids, are not well-equipped physically for incurring the risks of malnutrition and indigestion which "doped" foods necessarily present. Besides this, practices of the kind under consideration greatly complicate all questions of diagnosis and diet in ailments of the digestive organs.

Dr. Brewer recently told the Swindon Trades Council that it was absolutely essential that the food of the people should not be artificially preserved. The addition of any chemical material did more harm than putrefaction. Putrefaction of food, although it might not make it palatable, did not lessen its food value.

Unhappy Grocers.

A striking instance of honesty and the way in which one's conscience and the Government-meddling-in-industry may be circumvented, is afforded by the eighteen resolutions which were passed by American grocers during the Trade Practice Conference recently held in Chicago. These resolutions provide a fairly comprehensive survey of what is possible in the way of unfair practices in the grocery trades. It is not pleasant reading for the outsider! However, as an American contemporary remarks: "It is clear that the grocery trades are determined to clean up and regulate their own business affairs before the Government steps in with unwholesome legislation."

For instance, we read that it was resolved that the making, causing, or permitting to be made, or publishing of any false, untrue, misleading, or deceptive statement, by way of advertisement or otherwise, concerning the grade, quality, quantity, character, nature, or origin or preparation of any grocery product, is an unfair method of business.

Gelatine in France.

According to information received from the American Trade Commissioner at Paris, fruit flavoured gelatine is almost unknown to the French, and little, if any, is produced in France. A certain amount is sold to English and American residents. It is suggested that the French taste might be educated to the use of fruit gelatine, but little progress has so far been made in that direction, probably because of the French preference for natural fruit flavours.

Although plain gelatine is sold extensively in France, very little is imported on account of the effective control of the local market by a French trust, which is understood to be associated with a European glue and gelatine cartel. Practically all imported gelatine is brought in through firms participating in this cartel. France exports almost seven times as much plain gelatine as she imports, the value of imports, in 1925 and 1926 being about £14,400 and about £14,700 respectively, whereas exports amounted to about £98,000 and £96,800 for the corresponding years.

Cod-Liver Paste.

The boiled fresh liver of the cod, as served in Norway with boiled cod, is generally regarded as a delicacy that enhances the appeal of the dish, besides supplying in concentrated form several of the vitamins, and also iodine and phosphoric substances, so essential to health. Liver paste, prepared from the fresh liver of the cod and packed in air-tight tins, has now been placed on the market in Norway and has gained great favour. According to a statement made by E. Langfeldt, it is very rich in vitamins A and D. It is six times as rich in vitamins as butter; at the same time its iodine content is about five times that of ordinary canned fish and two or three times that of fresh fish. Further, it is rich in organically bound phosphorus.

Fishery Research.

The annual report of the Fishery Board for Scotland, recently published, outlined the sea fishing investigations carried out by the Board during 1927. Research work was directed mainly to herring and the haddock with the object of determining what changes are occurring from year to year in the respective populations. By the collection of detailed statistics information has been obtained as to the abundance and compositions of the actual stock of fish on the different grounds at different seasons of the year. It is hoped, by this means, to forecast when and where fishing is likely to be most successful.

Dried Milk.

In an article by Herrmann dealing with the modern German methods for the production of dried milk, it is stated that the author has examined a large number of dried milk products from the physical, chemical, and keeping standpoints, reference being made to products which have been prepared by various processes, including dried milk prepared by the spraying process and that prepared by drying on a heated revolving cylinder. The spraying process appears to give the better product, probably because it is subjected to the higher temperature for a shorter period of time and also in a more finely divided state. Sprayed dried milk is more easily soluble and possesses superior keeping qualities to that prepared by any other process. The author recommends that cream pasteurising should be carried out separately and rapidly, by means of which a product is obtained of superior colour, flavour, and keeping qualities. The ferments are not destroyed during the pasteurising of milk powders; lipolytic bacteria are also retained by milk powders to some extent.

Considerable research work has been carried out in Germany on the nutrition aspects of dried milk products. For human consumption, and particularly for children, dried milk products, at best, are only substitutes—and a convenient method of preserving—for fresh milk. Whenever possible, fresh milk should be used. Herrmann is of opinion that the cylinder dried milk should be used for confectionery products. The author in his article summarises the extensive processes used in milk drying operations, the various applications of the products, and also offers valuable opinions on the nutrition researches which have been carried out in Germany within recent years.

Frozen Eggs.

Thoroughly scientific and hygienic plant and methods are employed in U.S.A. for the production of frozen eggs. The floors and walls of a modern establishment are lined with white tiles, and the employés have clean, white overalls and caps. The processing operations, including packing the eggs by machinery and the hygienic control and inspection, are remarkably efficient. The eggs, supplied in cases of thirty dozen, are put into a freezing chamber and are then transferred to a special department where each egg is properly examined. The eggs are shelled by machinery, again tested, packed into cases, and returned to the refrigerator. After freezing, they are put in a cool place to await delivery. Generally, the freezing plants are situated near the poultry farms, and the farmer sends his eggs to the nearest authorised dealer. Thus the farmer has no need to trouble about packing, has a quick turn-over, is saved the cost of packing and transport, and has a steady market for his eggs.

Soya Products.

For many centuries the Soya bean has been used as a food in China and Japan. The first description of it dates back to 2836 B.C. Nevertheless, it was not till the second half of the last century that a combination of circumstances arose which led to its more extended use. From 1870 onwards there set in a great stream of Chinese immigration into Manchuria, and from that time the cultivation of Soya increased enormously; large quantities were, and still are, exported from Manchuria into Japan, China, and Europe.

In Europe the possibilities which it offered as a foodstuff of extraordinarily high value were not generally recognised until after the Vienna Exhibition of 1873. In view of the fact that, as compared with wheat flour, the bean is about four times richer in protein and nearly twenty times richer in fat, it is not surprising that many attempts were made to prepare from it a product, such as flour, which would be acceptable to the European palate. But serious difficulties were encountered owing to the rapid development of rancidity; hence it came about that complaints were made concerning the bitter taste of the products and their purgative powers. The result was that attention was directed to extraction methods, which aimed at the removal of the cause of rancidity, but these were doomed to failure for the simple reason that the extraction of oil—in itself a nutritive loss—brings about serious changes which impair the nutritive and biological values of Soya products.

These apparently unsurmountable difficulties did not, however, deter the extraordinarily persistent efforts of Dr. Berczeller to solve the problem of how to produce a palatable and otherwise desirable flour from the Soya bean without in any way diminishing its nutritive value. After ten or more years of scientific research he discovered the secret, and it was not long before a commercial process was developed. On the Continent is being manufactured Soya flour which, whilst retaining its original content of oil, is not subject to the rancidity and other imperfections of the earlier products. Now, we learn, preparations are being made to manufacture the Berczeller flour in this country. As one may well imagine, the venture is attracting considerable attention. The flour is used in bread-making, thereby increasing the nutritive value, digestibility, and keeping qualities of the loaf. Moreover, it can also be used as an ingredient in chocolate, cocoa, confectionery, biscuits, sausages, etc., with economical results. We shall follow these developments with great interest.

The Care of Cheese During Storage

By L. J. LORD

This is an important article giving an account of the factors which affect the keeping qualities of cheese in storage, and it gives practical advice on how to provide the most suitable storage conditions.

THE PRACTICE of buying cheese from the makers when new and immature is not universal, being prevalent only in certain districts and in relation to particular kinds of cheese. From the general provision merchant's point of view, it is a practice to be avoided, if only for the reason that the cheeses must inevitably lose weight, and at the same time be subject to influences that tend to reduce their market value if not suitably handled and controlled.

The risk of loss may arise from the storage surroundings, but is equally likely to be due to the action of causes that arise from within the cheese itself. This really primary risk is greater or less according to the experience and knowledge of the buyer, who judges the quality—and character—of the cheese by personal inspection at the time of purchase.

Where the newly bought cheeses are left at the farm, or factory, waiting instructions to be shipped to the retailer, no further care is called for, except at the hands of the maker in putting them on rail. But if it is part of the business to have the cheese delivered in quantity to the "produce house" for later sale, or to be held awaiting the call for supplies in relation to a further manufacturing process when mature, then the question of proper care arises during storage.

Storage Factors

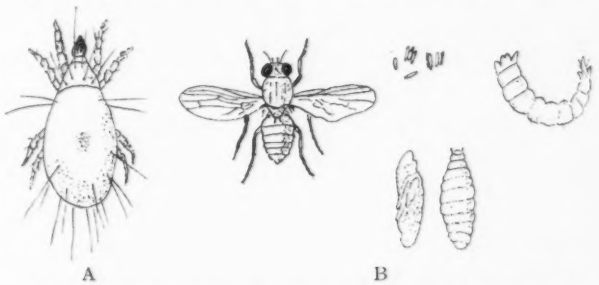
While the type of cheese that may be under consideration in the application of these notes—and the character of the batch of cheese, which, whatever type or kind it belongs to will depend upon its particular composition and condition at the times of coming into store—may require special consideration in certain circumstances, we may enumerate the factors that will affect them in store as applicable to all in greater or less degree.

These factors are the following:

1. The temperature of, and amount of light in, the storeroom.
2. The degrees of moisture and ventilation.
3. The presence of cheese mites and flies.

Temperature

The temperature of the place where cheeses are stored should be reasonably low—that is, not higher than 55° F. if possible. At this warmth little harm can come to the cheese on the score of temperature. If it is a little lower so much the better, unless the cheese is very new and it is desirable to bring the ripening process into full swing. Even so, a gain in time in order that the cheese may be sold at an earlier date means an inferior texture in the cheese, and can only reasonably be applied to stocks that are required to satisfy a demand for "new" cheese, where the trade cuts up cheeses in a comparatively moist and uncured condition, so long as they are outwardly dry and have developed a mild flavoury taste. In such instances a temperature of 65° F. is not too high, and about the only other case in which it is desirable is where Gruyère cheeses are made. These need a similar amount of warmth, in the earlier stages only, to develop the "eyes" and the subsequent special flavour that is associated with them.



A B

A, Cheese Mite (*Acarus siro*) as seen under the Microscope.

B, The Cheese Fly (*Piophila casei*), with Eggs, Larvæ, and Pupæ. A small black fly about $\frac{3}{16}$ of an inch long. The eggs, laid in cheese, become maggots in from 36 hours to 4 days. After feeding for about 15 days, these turn into tiny golden-brown pupæ, changing into the flies in another 10 days.

(By courtesy of Messrs. Cassell and Co., Ltd., from "Cassell's Popular Science.")

But, as stated in a previous article, apart from the question of ripening there is a considerable loss of weight liable to take place at the higher temperature, most of it being due to loss of moisture by evaporation; though, as soon as the temperature of a storeroom rises to the neighbourhood of 75° F. we also find that fat exudes from the cheese, which is a still more serious loss.

The older the cheese the more slowly will it lose weight, as the pores of the cloth bandage have become filled with dry matter and the cheese rind has hardened and become less porous. Other things being equal, it has been found that 100 lbs. new cheese (Cheddar) will lose in the first month approximately, at 55° F., $3\frac{1}{2}$ lbs.; at 65° F., 4 lbs.; and at 75° F., $4\frac{1}{2}$ lbs. in weight. In the second month the loss is recorded as having averaged per week 6, $6\frac{3}{4}$, and 10 ozs. respectively, while in the third month the loss is shown as $3\frac{1}{2}$, $4\frac{1}{2}$, and 10 ozs. again per week. These figures indicate the great desirability of having a cheese store where the temperature is not liable to rise much in hot weather, for although we do not usually experience such warmth for any length of time, 75° F. is not by any means outside the range of probability in the summer season.

When the temperature is so high that the fat oozes out of the cheeses, their quality and sale value suffer definitely; but it is also as definite that the lower temperature of 55° F. is highly favourable to conserving the quality of the cheese, while, if storage is to go on for any length of time, the cold store at 40° F. is the best place for it. There is no advantage in using a lower temperature, and cheese suffers in quality if stored at or below freezing.

Light

Light is a factor that does not appear to play so important a part in storing cheese in the warehouse or food factory. Yet the absence of light is a means of protection in that under such conditions the cheese fly is discouraged. Cheeses well protected with a strong coat do not usually suffer much from fly, but those of a type not possessed of a smooth, hard rind soon get "struck" if there are flies about.

For this reason, a cheese store should have shuttered windows so the daylight may be entirely excluded in summer time.

Moisture

Moisture in the air surrounding the cheese is the next point for consideration. Generally speaking, a cheese store requires to be what in ordinary language we describe as dry and well ventilated, because if the air is charged with moisture there soon develops a surface mould on the cheese which is not, as a rule, desirable. On the contrary, if the cheese stored is expected to develop veins of blue mould in the interior, in the course of ripening—such as is the case with Stilton or Wensleydale cheese—the moisture in the atmosphere is helpful.

If the matter of cheese storage is a sufficiently important one in the activities of the firm considering it, then a hygrometer will be installed for the purpose of taking humidity readings.

A hygrometer that automatically indicates the relative humidity—like a wall barometer with a pointer and dial—should register about 75 degrees of moisture in a store for ripe cheese of the hard skinned varieties like Cheddar, Gruyère, Edam, etc.: up to 80 degrees for smaller cheeses if not protected by tinfoil; and from 85 to 90 degrees for unprotected cheeses of the "blue" varieties. This last figure is "Very Moist," according to the indicating needle on the instrument.

Ventilation should be free, but no draughts are admissible, otherwise the cheese will tend to crack and lose weight more freely. The more moist the air the more regular should be the ventilation so that stagnancy is not evident. Storerooms inclined to be over warm should be tightly closed during a hot day and opened freely at night so that the cool night air may circulate and refresh the surroundings.

Mites and Flies

We come now to the plagues of the cheese store, the most persistent being the cheese mite.

This little animal is exceedingly minute. It reduces cheese to a light dust, which, if carefully watched, may be seen with the naked eye to move, and this moving dust, upon examination under a microscope, will be found to consist of some dirty débris in which there are crawling about tiny crab-like creatures. They appear to come from nowhere, as, although never seen upon new cheese, they invariably put in an appearance when cheese is kept for any length of time in cool, dry surroundings. With semi-hard types of cheese, if not checked, they speedily reduce the rind to a honeycomb condition.

Whenever they appear it is necessary to clean both cheese and shelves daily with a soft brush. Washing the shelves down with a solution of formalin is said to be in some degree a cure and preventive of further attacks, but the most effective method is to subject the storeroom and cheese in it to fumigation by means of carbon bisulphide.

This treatment is applied in the following way:

These cheeses—if they have already been exposed to the probability of mite infection—should be placed on their sides or edges upon the floor or lower shelves of the store, and the bisulphide placed in shallow dishes higher up, preferably on the top shelves. Now, carbon bisulphide is a highly poisonous and dangerous substance, and this part of the work needs to be done as quickly as possible, and the operator must leave the room at once. No artificial light of any kind should be used.

Windows and doors are now to be tightly closed and left so for two days. At the expiration of this length of time the room is opened gradually, so as to allow the gas to filter away thoroughly before any person enters. There will be an objectionable smell perceptible for a day or two afterwards.

The quantity of bisulphide recommended is 1½ lbs. for every 500 cubic feet of air space in the storeroom. A second application is advisable after a short interval if it is a store that has become very badly infested with the mites.

About the only other thing to do with cheeses that are infested is to dip them—unbandaged and slung in a cloth—in scalding water for a few seconds. They must then be wiped, exposed to the sun or gentle warmth to dry, and rebandaged in new cloth. They can be rubbed with flour when dry if it is desired to dull the bright surface induced by the scalding, and then the bandage is rolled or sewn on.

The true cheese fly is a tiny insect about three-sixteenths of an inch long with transparent wings. It seeks the damaged places on the cheese surface, especially cracks or soft crevices, and the eggs laid will, in a couple of days, hatch out as maggots, which at once begin to feed upon the cheese. These "skippers" go on feeding for about two weeks and then pupate, later to become flies in their turn and lay more eggs to provide the next generation. In cold spells of weather, and presumably throughout the winter, the pupæ or chrysalids remain in the quiescent stage of their development, the new flies hatching out as the surroundings get warmer. Flies are said to be attracted when walls are whitewashed if size is used in making the wash. Whitewash advocated for cheese factories is made up of two parts slack lime and one cement.

All cheeses in store require turning upside down occasionally in order to preserve their shape and pre-

(*Continued on page* 10.)

Power Economy in the Food Factory

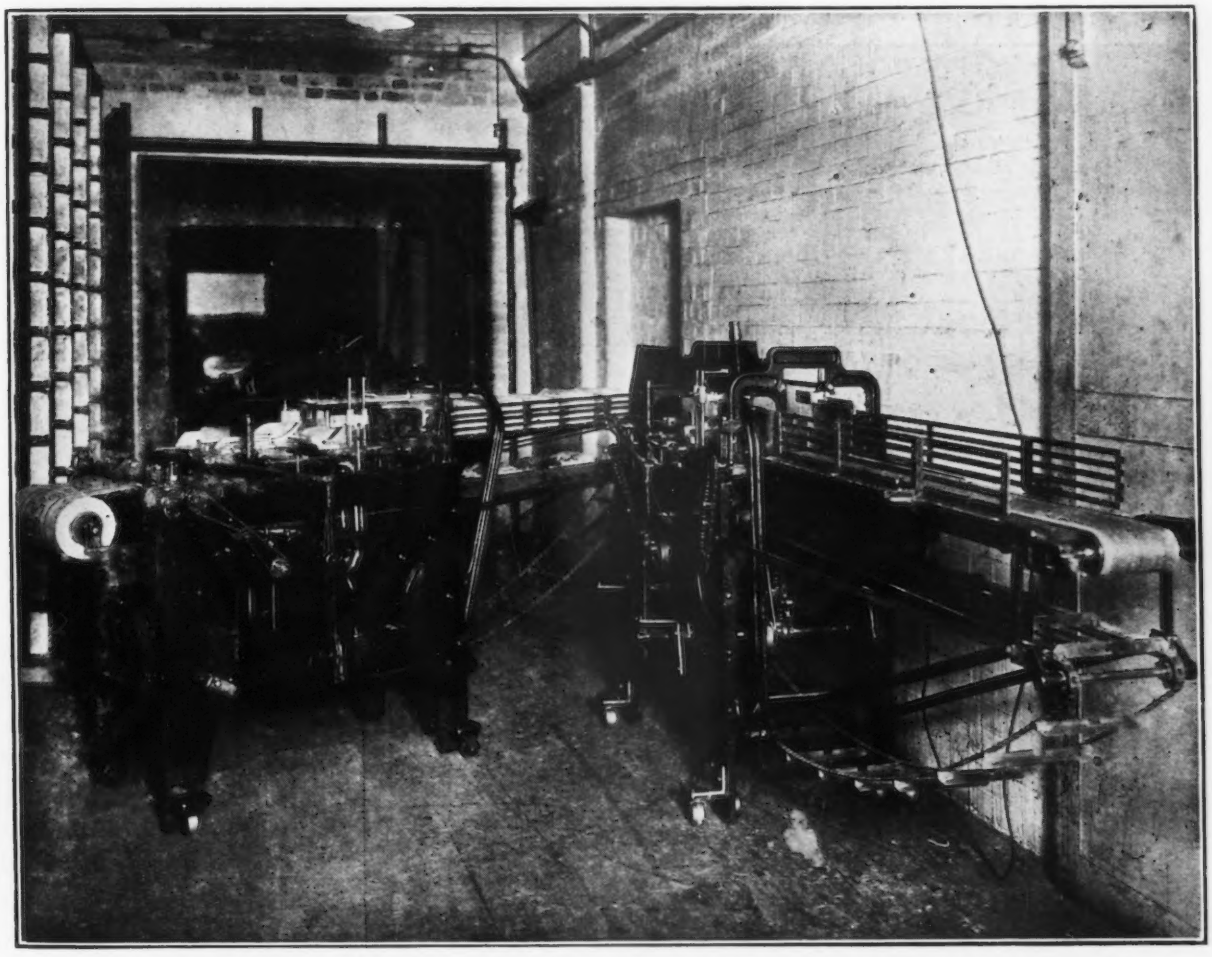
By "KILOWATT"

PART IV

THE RELATIVE merits of direct current and alternating current motors having been briefly discussed in the previous article we will now proceed to deal with the salient points connected with the selection and purchase of electrical equipment, which is an all-important factor in the economic running of the plant in a food factory. So important is this question of how to purchase electric motors that one could well write a handbook for the non-technical buyer, but we must content ourselves here with an outline of the essential points to be borne in mind. The practice of the buyer to pin his faith to one firm whose name may be known to him has its objections, inasmuch as it has the tendency to stifle competition and limits the choice available. The power user, therefore, should not restrict his inquiries, but obtain quotations from all the reliable makers, and, providing he stipulates compliance with B.E.S.A. specifications, he will have at his service the research and experience of a representative number of electrical manufacturers. A guarantee that an electric motor complies with the applicable specification (No. 168 of 1926) of the B.E.S.A. is the best possible safeguard that a buyer can have.

Speed *v.* Price

Then comes the question of speed *v.* price. Generally speaking, a motor running at, say, 1,000 r.p.m. will be approximately half the price of a motor running at 500 r.p.m., and the 1,000 r.p.m. machine is considerably smaller, although the horse-power and temperature rise may be the same. In order, therefore, to obtain a low first cost, the higher speed motor is



An example of Individual Electric Drive for Bread Wrapping Machines. In each case the Motor is mounted on the Machine Frame, Power being supplied through Flex from nearest Power Point.

usually offered, unless a lower speed is specified. If, however, a high speed motor is installed on account of lower initial cost, it may be necessary to employ some form of speed-reducing gear, but it should be borne in mind that the efficiency of a high speed motor is higher than that of the slow speed type.

Ball or Roller Bearings

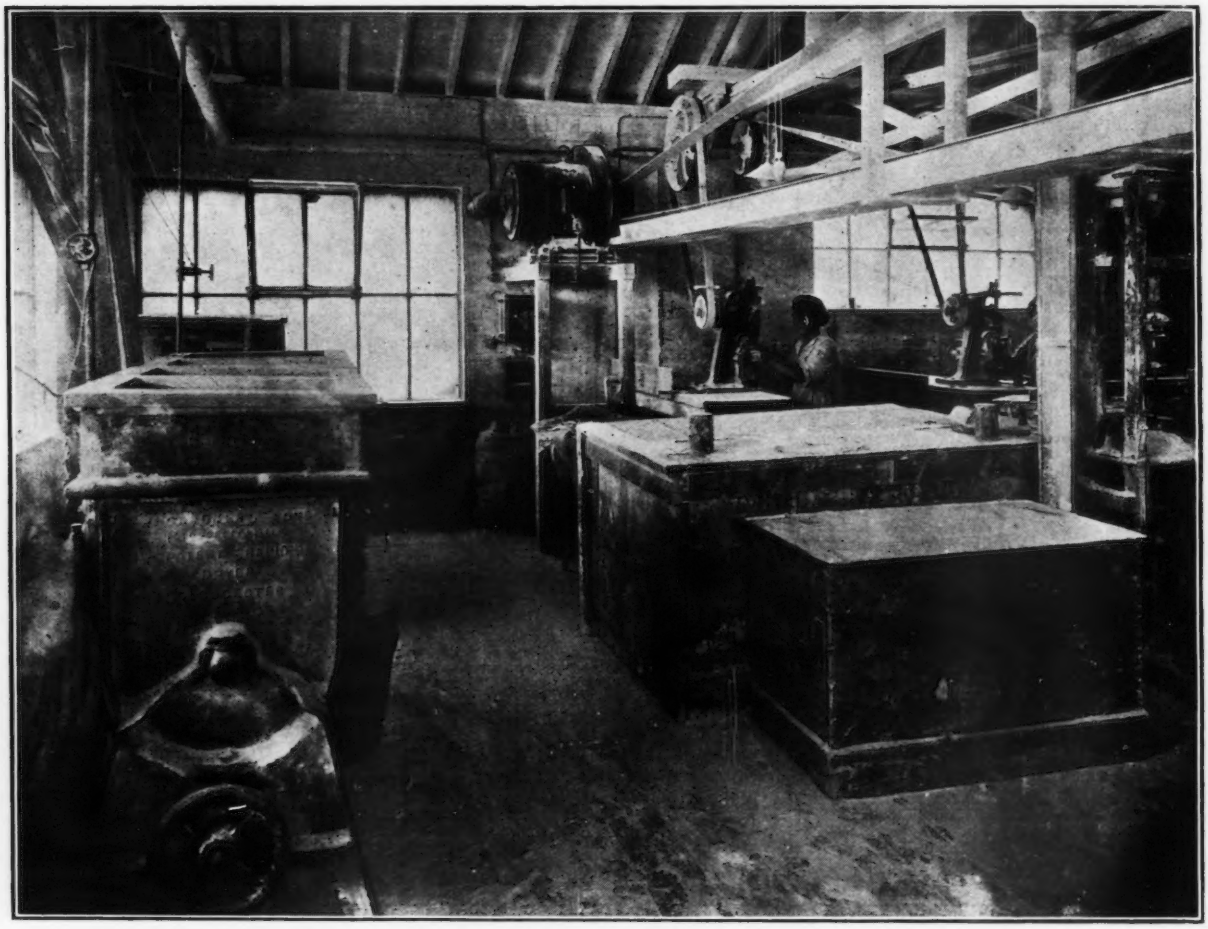
The question of bearings is also of considerable importance. When inviting quotations it is wise to specify the type of bearing required. These bearings should be ball or roller, or a combination of both. The efficiency and reliability of such bearings are unquestionable, and nearly all modern manufacturers producing a machine of good quality are using them.

Motor Protection

A further consideration in the purchase of motors is the type of protection required for use in a food factory, and the power user must first of all decide what type of machine he requires, whether it be protected type, ventilated enclosed type, pipe ventilated, totally enclosed, and so on, and insure that the comparison of quotations is equal on this basis.

The question of the kind of motor casing most suitable for protection must be to a large extent governed by the intended location of the motor itself. If the motor is to be fixed in an exposed position, or in a very dusty or damp situation, a totally enclosed machine should be employed; but it must be borne in mind that the more "enclosed" a motor, the more expensive it is for a given power—in other words, the more enclosed it is the less power will it give if its heating rating is to be kept within the limit. All motors require a certain amount of ventilation, and it is obvious in the case of the totally enclosed machine that there is less chance of the outer air passing through and keeping it cool. Manufacturers have introduced various methods of providing ventilation to this class of motor, which overcomes to a large extent the ventilation question.

Where the location of the motor permits its use under covering, and only needs a fair amount of protection, the enclosed ventilated type may be used, and where it is possible to fix it in a clean, dry place and away from flying dust or fluff, the simple "protected" pattern will suffice. This latter machine has its vital parts more or less exposed to injury, and, of course, is sufficiently open to allow the collection of dust and dirt internally; it is, therefore, essential that its working conditions should be good. Although a cheaper type of motor than the other



Totally enclosed Motor mounted on Girder Driving Presses in a Department where the Atmosphere is distinctly Dusty.

patterns, it is equally reliable if used under proper conditions.

Where the situation is such that a fair amount of liquid is present, obviously the totally enclosed pattern will be called for, but, on the other hand, the driving might well be done with the protected type motor provided with a wooden covering if the atmosphere is distinctly dusty. Blowing and drying plant could equally well be operated with this pattern motor.

It may be useful to set out here briefly the recognised definitions of the types of electric motors available for industrial purposes.

Open End Bracket Machine.—This machine has end bracket bearings forming an integral part of the machine yoke. It has the advantage of good ventilation, but the restriction that it can only be used in a machinery room.

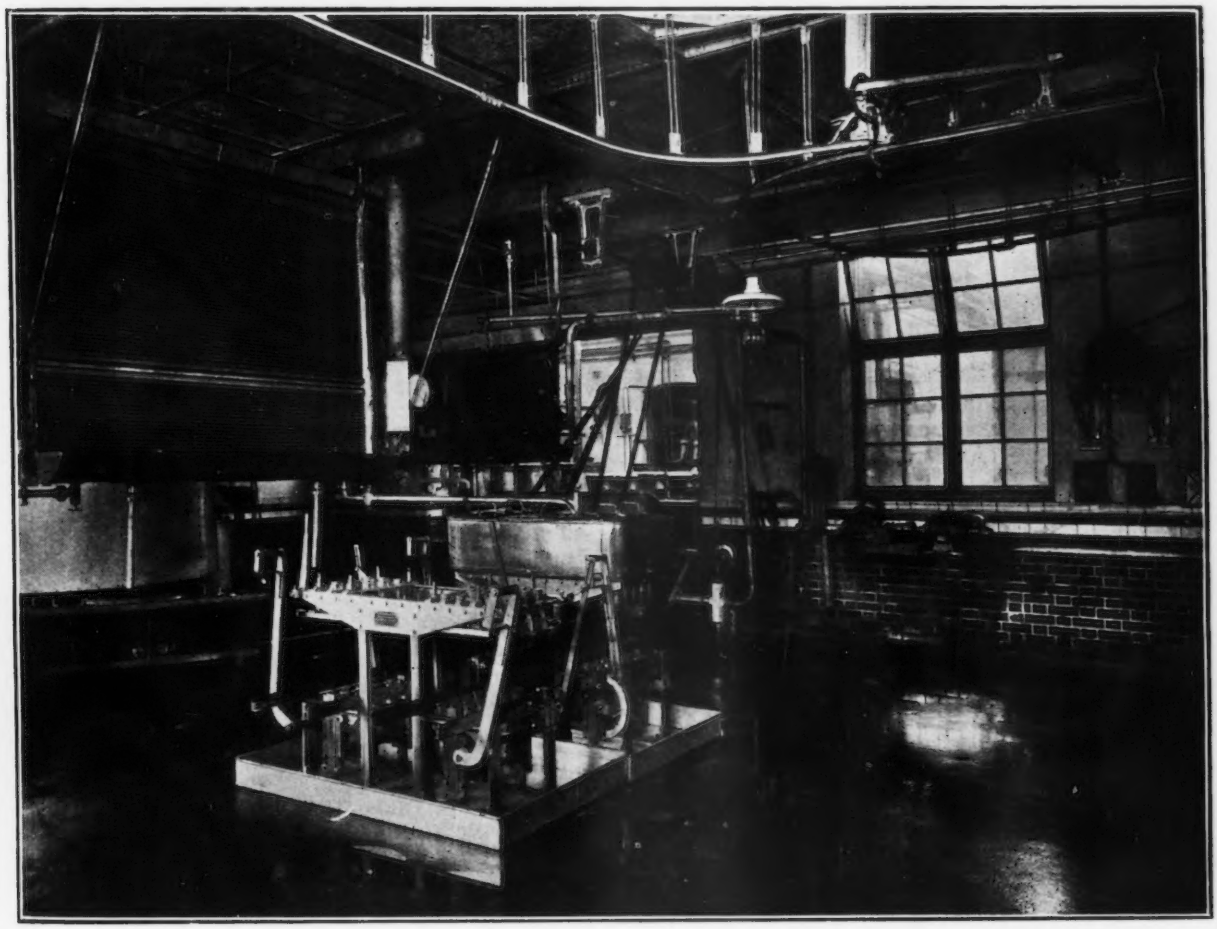
Protected Machine.—One in which the internal rotating and live parts are protected mechanically from accidental or careless contact. A machine of this type is suitable under certain factory conditions.

Enclosed Ventilated Machine.—One in which the ventilated openings in the frame are protected with an expanded metal screen, the apertures in which, in compliance with the rules, do not exceed ½ sq. inch in area. It is easily ventilated, usually being cooled by an internal fan, and is readily accessible for cleaning and inspection.

Totally Enclosed Machine.—Enclosed so as to prevent circulation of air between the inside and outside of the case, but not necessarily airtight. It is suitable for positions where there is damp, or dust of not too fine a nature. As the machine is totally enclosed and, therefore, gains no direct ventilation to its windings from the outside air, its heat has to be dissipated by radiation through the case. A slightly increased temperature rise is therefore allowed for in this type of machine. The cost of a totally enclosed machine is approximately 75 per cent. more than that of an enclosed ventilated machine of the same horse-power output.

Pipe Ventilated Machine.—Arranged so that the ventilating air may be conveyed to or from the machine through pipes attached to the frame. The open ends of the pipes are generally conducted to clean dry air. There is quite a wide field of use for this particular type of motor, and in actual cost is very little more than that of the ventilated enclosed pattern.

Drip Proof Machine.—This has a frame provided with openings for ventilation, but protected so as to exclude falling water or dirt. Suitable for use in very damp situations.



Electric Drive in a Dairy. The Motor is mounted on a Wall Bracket as protection against the Wet Conditions Existing.

Speed of Machines

The next question for consideration is that of speed. Generally speaking, plant in the food factory has a fairly steady constant speed, and as the standard electric motor is designed to run at comparatively high speeds, the adoption of some form of speed-reducing gear is called for. This speed reduction is sometimes effected through varying the size of the pulleys, by the use of chain drives, or, where a considerable reduction in speed is necessary, some form of spur-gear speed reducer may be employed. In selecting the speed of the motor, one may be attracted by the lower price of a high-speed machine, but it is sometimes desirable to sacrifice this saving. For example, in the case of a totally enclosed motor, the greater the area of surface exposed to the air, the more quickly is the heat radiated, and, as a low-speed motor of given power has a larger surface than a high-speed motor of the same power and type, it follows that it is less affected by temperature rise.

Again, it is frequently possible more than to repay the extra cost of a low-speed over a high-speed motor by the saving in cost of energy effected by installing a motor for belt driving of such a speed that a good-sized pulley can be used. The result will be an appreciable reduction in the power absorbed in bending the belt round the pulley, a reduction in the power wasted in slip, and a further reduction in wear and tear of the belt. Moreover, a slow-speed motor has a longer life and lower maintenance costs.

Size of Motor

When selecting a motor for either direct or alternating current working, it is necessary to consider the work which the machine has to perform. Both the average and maximum conditions of load must be taken into account. While on the one hand the maximum load may represent an occasional overload of short duration, in other cases it may occur at starting. Economy demands that initial costs be kept down to a minimum, and, therefore, that the motor should be as small as will properly meet the requirements, but this should not lead one to underestimate the load requirements. It is obvious that the use of too small a motor would subject it to frequent overloads, resulting in excessive temperature, with consequent increased cost of maintenance and repairs. On the other hand, if the motor is too large, in addition to increased first cost, its operating efficiency would be lower, and in the case of an A.C. motor a poor power factor would result. It must be remembered that the average motor is designed to give high efficiency between one half and full load; below half load the efficiency decreases rapidly. It is true that the use of a larger size motor than may be actually required may not materially increase the power bill, and may even be some guarantee of long satisfactory service, but it is, nevertheless, a mistake, especially in alternating current work, to install machines which are much too large for their ultimate duties. As a general rule, the size should be so chosen that the motor will operate between three-quarters and full load most of the time. The overload capacity of a motor may be relied on to take care of a maximum load up to 25 per cent. more than the rated horse-power of the machine, provided it is of short duration. It is well to keep to manufacturers' standard sizes and speeds, as they cost less and repair parts are more easily obtained.

Forthcoming Exhibitions

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(*Continued from page* 6.)

vent them sticking to the shelves. Also it allows for a general inspection to see that they are keeping in good condition.

If any slimy spots are discovered when turning hard cheese they are best wiped with a rag that has been dipped in methylated spirit.

The presence of slimy matter is part of the ripening process in relation to some of the foreign varieties of cheese. But it is removed or brought to a dry state before wrapping them. On English hard cheese slimy spots constitute a fault, and are apt to lead to early decay; in any case, they indicate that the cheese will not keep very long in a creditable condition.

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Protein Digestion

By J. WILSON, B.Sc.

The following article reviews the knowledge so far accumulated concerning the scientific principles underlying the manufacturing processes available for the preparation of predigested proteins. The information presented is based on extensive researches conducted by the author into this complicated and little-understood branch of food manufacture. The article clearly states the difficulties and problems involved in manufacturing procedure.

AS EVERYONE knows, the proteins are complex condensation products of amino acids, for which all animals must depend ultimately on plants. The process of assimilation, however, involves a prior process of digestion, for the proteins, being highly complex substances of a colloidal nature, cannot pass directly from the alimentary canal to the blood, but must first be digested or hydrolysed to a mixture of amino acids. The latter can then reach the blood stream and so circulate to the organs of the body where synthesis once more takes place.

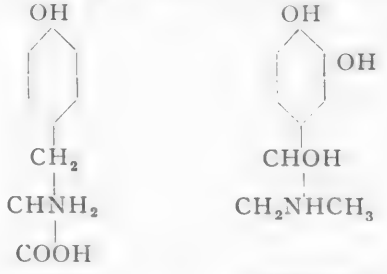
Now the object of many manufacturing processes is to predigest the proteins in order to present the consumer with a product which is more assimilable, and which contains a better balance of amino acids and accessory food factors such as vitamins and inorganic salts. These points are vital, for total nitrogen content, or even amino acid nitrogen content, of a digested protein is no criterion of its dietetic value. Digests devoid of certain amino acids, such as tryptophane, tyrosine, and proline, are valueless for insuring growth or for the maintenance of life. In addition, a due proportion of mineral salts and a proper vitamin content, which can now be quantitatively adjusted with considerable accuracy, is essential; but the matter has been so well advertised that there is no need to stress the matter further.

To bring about this predigestion two general methods are available: (1) Digestion by means of acids and alkalies; (2) digestion by means of the proteolytic enzymes occurring in plants and animals.

Acid Digestion

Proteins were digested by acids as long ago as 1820, when Braconnot used dilute sulphuric acid for the purpose. Other investigators have used hydrochloric acid, and this is the method now employed industrially. The protein to be digested—say, meat freed from fat and connective tissue and then minced—together with soya bean casein, or yeast, is placed in an autoclave with from ten to twenty parts of 20 per cent. hydrochloric acid and heated. The liquid gradually turns dark brown, and if samples are taken from time to time, neutralised with sodium carbonate, and tasted, it will be found that as hydrolysis proceeds the taste, which is at first intensely bitter, due to the presence of peptones and polypeptides, becomes more and more palatable, until at last, when hydrolysis is complete, it has a rich meaty flavour, though, of course, there are differences in this final flavour in accordance with the protein digested.

On completion of the hydrolysis, recognised by the absence of the biuret reaction, the contents of the autoclave are neutralised and filtered ready for use. The humin-like residue, which represents about 2 per cent. of the proteins digested, contains, in addition to cyclic bases, considerable quantities of tyrosine and cystine. Nevertheless, so far as the writer's knowledge goes, no use is at present made of this material, though it would seem an easy matter to separate these amino acids, and, in view of the close relationships of tyrosine to adrenaline, use the former as a starting-point for the synthesis of new bases possibly of great physiological importance.



Tyrosine Adrenaline

The chief virtue of this method of digestion lies in its ease, simplicity, and completeness. The amino acids are only partly racemised. There is no danger from bacteria, and the digestive agent is easily converted to salt, which acts as a preservative of the final product, and is not detrimental to its use as a flavouring for sauces, meat extracts, etc.

The disadvantage of the method lies in the fact that the vitamins are destroyed and that the mixture of amino acids produced when fed as an albuminoid food to dogs does not prove acceptable, and is liable to cause vomiting and diarrhœa, possibly due to the formation of foreign substances and the partial racemisation of the amino acids during hydrolysis. Nevertheless, in the light of recent advances and the appearance on the market of standardised solutions of vitamins, it would appear that the disadvantages attendant on the method are by no means insuperable.

Alkali Digestion

The digestion can also be carried out by means of caustic soda and subsequent neutralisation by means of hydrochloric acid. The hydrolysis is just as complete, but certain amino acids, such as arginine and cystine, are destroyed, while the remainder are completely racemised; in other words, the alkali method possesses all the disadvantages of the acid method, together with other evils peculiar to itself.

Digestion by Proteolytic Enzymes

In consequence of the various disadvantages enumerated above, many attempts have been made to digest proteins by means of proteolytic enzymes, so as to preserve the vitamin content, and possibly by imitating the animal digestive system to produce a mixture of amino acids more acceptable to the human organism.

In the body protein digestion commences in the stomach, where pepsin working in a slightly acid medium—the optimum PH is about 1·6—rapidly hydrolyses the protein molecule to primary and deutero albumoses, thence to peptones, etc. The food emulsion then passes to the intestines, where it is successively attacked in a faintly alkaline medium by trypsin and erepsin. The primary albumoses rapidly disappear, giving rise to deutero albumoses and peptones, polypeptides, and amino acids, the latter being immediately absorbed in the blood stream.

But when we come to imitate this process on a works' scale, difficulties arise. The process, carried out under the usual conditions of enzyme digestion is very slow, necessitating an incubation of several weeks. Thus Abderhalden digested meat for six weeks with gastric juice, four weeks with pancreatin, and four weeks with erepsin before obtaining a product free from polypeptides, though the product, when obtained and mixed with fat and carbohydrates, proved acceptable when fed to animals. Nevertheless, such a method, quite apart from the question of cost, is inadmissible in its present form on other grounds. It is virtually impossible to sterilise a large quantity of meat, and even though antiseptics are employed, it is found that when large batches are put through the bacteria apparently become "acclimatised," and continue to breed and multiply with complete freedom, or else in the case of smaller batches the spores secrete proteolytic enzymes of their own which set up side reactions and impart to the final product a rather sickly sweet taste. In addition, when the concentration of amino acids reaches a certain value the enzymes apparently proceed to synthesise fresh proteins as well as to break down the original ones. This explanation originally put forward by Borsook and Wasteneys,* and confirmed by other workers, notably Oda† and Marston,‡ has recently been disputed by Rona and Chrometzka,§ but the fact remains that insoluble products do make their appearance whether they be fresh proteins as suggested by Wasteneys and Borsook or merely deaminised products as suggested by Rona and Chrometzka.

The difficulties seem insuperable, and from the industrial point of view the whole process needs speeding up. Perhaps a way out may be found by the employment of enzymes such as papain or bromelin, which will react very rapidly at temperatures of from 80° to 90° C.—*i.e.*, at a temperature too high for bacterial growth. That some such solution of the problem is possible is apparent from the number of yeast preparations on the market, many of which are simply autolysed yeast—in other words, yeast which has been digested by its own proteolytic enzymes.

A variation of the same solution is contained in the patent specification‖ of an American firm, Ward Baking Company of New York, who propose to digest rice polishings, wheat bran, and cereal germs by first cooking the raw materials so as to gelatinise and saccharify the starch present, and then to bring into solution the proteins present by the action of pepsin, trypsin, and papain, working together in a slightly acid medium, at a temperature starting at 100° F. and rising first to 154° F. and finally to 170° F. They claim that their product is rich in vitamin B. Nevertheless, it does not appear to be completely hydrolysed, since they say that if it is introduced into bread in too large an amount it imparts an undesirable flavour, possibly (the supposition is the author's) due to the presence of unhydrolysed peptones and polypeptides.

The whole subject bristles with problems which are far from solution; the exact nature of the enzymes employed, and their precise mode of action are but faintly understood, in fact, a convenient and accurate method of analysis of a mixture of amino acids has yet to be devised.

* Borsook and Wasteneys, *J.B.C.*, LXII. (1924), pp. 15, 633, 675; LXIII. (1925), pp. 563, 575; *J. Gen. Physiol.*, VIII. (1927), p. 601.
† Oda, *J. Biol. Chem.* (Japan), VI. (1926), p. 77.
‡ Marston, *Austral. J. Exp. Biol.*, III. (1926), p. 233.
§ Rona and Chrometzka, *Biochem.* II., 189 (1927), p. 249.
‖ No. 186634, Accepted, U.K., March 3, 1924.

The Theory of Salt Curing

MOST textbooks on curing state that the theory of curing is quite simple, and that the process merely consists in the removal of water by osmotic forces. This view originated from the old-fashioned practice of curing by covering the meats with salt, which caused fluids to exude from the tissues, the cured products thus containing far less water than the original meat. The osmotic theory of curing seems, however, to afford no adequate explanation of the modern methods of curing, which permit of little or no loss of water. A study is therefore being made of the changes which occur when salt is brought into contact with muscle tissues, proteins, and blood pigments.

The equilibrium between water, salt, and protein is complicated, and it is too early to attempt to record results. One puzzling fact may, however, be mentioned. The exudate method was applied to pork and bacon, the reagent employed being ether, and it gave a result which might be taken to mean that the water-holding power of bacon is greater than that of pork. The figures are as follows: 100 gm. of minced pork was found by drying at 103° C. to contain 72·8 gm. of water. The exudate from 100 gm. of the same mince yielded 60·7 gm. of water, or 83·3 per cent. of the total. 100 gm. of minced bacon was found by drying to contain 63·1 gm. of water, and the exudate from 100 gm. yielded 25·5 gm., or 40 per cent. The increased water-holding power of the bacon cannot be ascribed in any simple way to the salts present, since 46 per cent. of them came away in the exudate.—E. H. Callow in *Report of the Food Investigation Board* for 1927.

Mayonnaise

By FRED. GROVE-PALMER

Some of the advantages of trade associations, even in comparatively small industries, are shown in the following article.

WHEN THE writer once commented on the increasing girth of an American friend, the reply was: "I guess I'm no stepmother to my stummick!" An answer that was typical of the country's outlook upon food in general, and the fact that there is a Mayonnaise Products Manufacturers' Association of America, Inc., having about one hundred members, proves this very clearly.

At the meeting held in Chicago the most varied subjects were discussed with the exuberance that is so characteristic of that great nation. They ranged from deliberations on changes in the freight rates for foodstuffs packed in glass, through conversations concerning a book to be issued to the cooks in the Union and another for the teachers of Domestic Science, extolling the virtues of mayonnaise (half a million of the first and one hundred thousand of the second will be wanted), to arguments on standard compositions.

The quantity of oil used came up for debate, and it was decided to reduce it from 60 per cent. to 50 per cent.

The restrictions as to the edible acid employed were removed. It is now possible to incorporate any of the following: Tartaric, malic, lactic, and others.

Stabilisers, as they are euphemistically termed, are to be increased from ½ per cent. to 1 per cent. Fortunately, if the preservative and the colouring matter are declared on the label, there does not appear to be any very great restriction as to their use. This simplifies life for the manufacturers very considerably.

Mayonnaise to be up to the standard should consist of a clean, sound, emulsified preparation composed of edible vegetable oil, egg yolk or whole egg, vinegar, lime juice, or other edible acid, and (maybe) salt, sugar, and stabiliser.

There may not be less than 50 per cent. of oil and not less than 6 per cent. of egg yolk solids whether from fresh or dried egg products. In the finished material the total of oil and egg yolk, apart from white of egg, amounts to 78 per cent., and there may not be more than 1 per cent. of the stabiliser.

The great bugbear of the mayonnaise maker is the separation of ingredients in the emulsion when it is subjected to changes of temperature. This naturally calls for research and experiment to find the most suitable colloid mills by means of which mayonnaise can be prepared. The search has been successful in finding a type in which emulsions have been made that can be frozen and thawed out several times without showing any signs of separation.

Depending as she does so largely upon the prosperity of the cotton growing industry, it is not surprising to find that America likes to use cotton-seed oil in the condiments for her salads and canned salmon. Unhappily the cotton-seed oil refiners are a sturdy race and do not show any signs of wanting to meet the Mayonnaise Association halfway with regard to low free fatty acid content of the oil; 0·05 per cent., they hold, is too low; they cannot guarantee less than 0·1 per cent. Hours of hard talk failed to convince them that the oil has a very hard battle to fight against moisture, oxidisation, acids, ultra-violet rays, bacteria, and enzymes from the egg yolk and the acid. The best cotton-seed oil is not too good for American mayonnaise, but these refiners were not impressed and they would not budge. Finally, the matter has been sent before a board of arbitration composed of equal numbers of the contestant parties under a neutral chairman.

This Association is by no means wealthy, but it is very evident that it is composed of "live-wires" who have the interests of their trade very much at heart. Not only are they anxious to discuss their problems fully and freely with each other, but they are also ready to put up substantial sums of money to enable adequate research to be carried out with a view to elucidating the more pressing of those problems.

Nutritional Bread (Wholemeal)

By J. BOYD

THE PROPRIETARY brands of wheatmeal or wholemeal that are on the market are many and varied, some coarse ground, others fine. They are all good, and each has an ever increasing number of supporters.

The manufacturers of those meals are naturally very strict as to the manner in which the finished product must be sold when bearing their name or trade mark.

As it is not permissible to deal with any firm's name in an article such as this, I will confine myself to wholemeal, or germ bread, that can be manufactured by anyone so minded and given any name to suit the circumstances.

There are millers who will be pleased to supply wheat germ in a pure state to anyone negotiating with them and specifying their requirements.

Wholemeal contains the germ of the wheat.

The germ has constituents of high nutritious value and has a wonderful flavour when made into bread.

Pure germ, when kept in a cool place, remains sound over a long period. If, however, it should be mixed with white flour, it very quickly goes wrong, owing to the unstable nature of the oily matter, of which germ contains a higher proportion than any other part of the wheat. This recipe makes a nice loaf, not too coarse:

Wheatmeal Bread.

2½ lbs. strong flour.
1½ lbs. wheatmeal (germ).
1½ ozs. yeast.
1 oz. salt.
Fully 2 pints of water at 102° F.

Make into a slack dough and toughen well with mixing; allow to lie in warm corner for 15 minutes, then knead well. Scale at suitable weights, mould, and place into prepared shapes. At the end of 30 to 40 minutes they should be fully proved. Bake in sound oven for 30 to 35 minutes. Size of loaves will determine time for baking.

Wholemeal Bread.

3 lbs. wholemeal.
1 oz. salt.
1 oz. yeast.
Water at 102° F.

Make into a fairly slack dough, keep at temperature of 85° F. to 90° F., knead every 15 minutes. In one hour from starting the dough should be ready for scaling. Then proceed as for the other bread.

It is essential that dough for all kinds of bread should be well kneaded. The water in the dough containing all that is necessary for the growth of yeast, there is nothing to hinder such growth.

When in dough, each yeast cell is confined to a very limited area, and as there is probably not a sufficient flow of moisture from one part to another, each cell is dependent for sustenance on the liquid in its immediate vicinity, and can only reach that further away by means of the buds it creates.

That is why dough that appears sluggish in fermentation starts vigorously again after being well kneaded. In the one case, the yeast, by creating gas, has pushed the source of gas production away from it; in the second case, this has been brought back by kneading. This is the case in a tight dough, and to a less extent in a slack one.

Yeast

Yeast performs two functions in a dough. It produces the gas necessary to bring about vesiculation of the bread during the baking process, and it also induces alterations in the chemical nature of the gluten of the flour, softening it, and in extreme cases destroying its original physical properties entirely.

It is thus necessary that the yeast shall be capable of living and growing vigorously, and not merely vegetating in a fermented piece of dough.

In order that yeast may function properly, food must be supplied to it.

Similar to all living cells, the principal needs of yeast are water, air, sugars, salts, etc.

If yeast be made to act for a sufficient time, the elasticity of the gluten will give way altogether and the dough (sponge) will collapse. Hence the good effects of yeast hold up to a certain point, after which its continued multiplication does more harm than good.

When a sponge is set away, the gas produced by the yeast elevates the dough (rising in tub), and whilst much of the gas escapes, that which is retained produces the spongy consistency of the dough.

Resistance is offered to the escape of the gas by the elasticity of the gluten of the flour.

Thus a weak flour, not being able to offer sufficient resistance to this escape of gas, produces a most unsatisfactory result.

For the successful manipulation of fermentative processes it is of no avail following recipes blindly, since changes take place daily in the factors governing fermentation, and if particular care is not taken the operation is apt to fail.

The bacteria in dough produce sourness and stultify the efforts of the yeast, and, at the same time, break down the resisting qualities of the gluten.

Abstracts from Papers

Refrigeration Methods in Food Preserving

THE AUTHOR gives a detailed account of the refrigeration methods in use for preserving foodstuffs. The various types of plant are well described for a large number of operations, including the following: Fruits, edible oils and fats, meats, fish, and dairy products. Numerous illustrations are shown. There is one section of outstanding interest relating to the modern methods of preserving fish. These are rapidly frozen in salt solution at low temperatures and then stored in that condition. Fish treated by this means can be maintained in a good state of preservation for a considerable length of time. A large number of illustrations show the plants which are used in the food refrigeration industry. As in other industries, the ammonia type of plant has found the most extensive application.

(Walter, *Zeits. für Chem.*, 1928, p. 797-801.)

Chemistry and the Canning Industry

(Abstract of a paper read by W. D. Bigelow, Esq., National Canners' Association, Washington, U.S.A., at the Symposium on Food Chemistry held on September 10-14, 1928, at Swampscott, Mass., U.S.A. Report in "J. Ind. and Eng. Chem.," December, 1928, pp. 1286-1289.)

The author has given an admirable account of the applications of chemistry in the canning industry, together with an extensive list of references on the subject. The matters dealt with include the examination of canned foods, processing studies, and tinplate.

In the canning of foods, sugar or salt is frequently added for flavouring, and water is used either to secure the desired consistency or to fill interstices within the can. Any sugar used should be free from sulphur dioxide, as even the presence of only traces tends to accelerate the corrosion of the inside of the can with certain fruits. Also, in the processing of fruits, any sulphur dioxide that may be present is reduced to hydrogen sulphide and forms a tarnish of tin sulphide on the inner surface of the can, tending to discolour the canned product. Such a tarnish is normal with protein-bearing vegetables, such as peas and corn, but is abnormal with fruits. In canning operations, soft water is preferable to hard, as an excessive amount of calcium in the water has a toughening effect on peas and shelled beans. The black discoloration of canned products is usually due to sulphide of iron or copper or to the combination of iron and polyphenol. A yellowish coloration often results from excessive sterilisation or too high a temperature of storage.

Considerable work has been done in bacteriological field surveys, in which the sources of spoilage bacteria have been studied. Sugar has been found to be the chief source; even the refined granulated sugar used in the industry may carry the spores of these spoilage bacteria. Wooden tanks, when used for syrups and brines, are sometimes sufficiently porous to harbour bacteria within the wood; this observation has led to the suggestion that hard surfaced tanks be used in place of those made of wood.

In order to have a clear understanding of the action of various preserved fruits on the can, it should be noted that coloured fruits whose colours are anthocyan pigments—that is, cherries and berries—are packed in enamelled cans in order to prevent bleaching, the anthocyan pigments being effective depolarisers. In enamelled cans the corrosion which results is largely confined to relatively small areas where the plate has been subjected to the greatest strain in forming the can—that is, in the double seam at the end of the can and along the side seam. In a plain can, the large anodic area of tin affords effective protection for the iron, while the small area of cathodic iron has little effect upon tin corrosion. Although the fruit acids have but little effect on corroding tin, the combined action of the acids and the fruit colours, which act as depolarisers, has a considerable corrosive effect on the tin. Moreover, the relatively greater area of cathodic iron of an enamelled can effects a corrosive action on the tin anode. Various factors contribute toward rendering the tin anodic to iron in canned fruits. The tin as it corrodes is to a large extent again reprecipitated by the fruit constituents; in berries the tin is largely absorbed by the seeds. The pulp of the fruit also tends to precipitate the tin in the absence of seeds.

The Spice Industry

(Abstract of a paper by Glassford, "J. Ind. Eng. Chem.," December, 1928, pp. 1316-1317.)

Spice enters largely into the production of food products such as mayonnaise, pickles, salad dressings, sauces, etc. The problem of the mayonnaise manufacturer chiefly concerns the preservation of the product, both mechanically and chemically, in the form in which it leaves the factory. Mayonnaise is a delicate product, sensitive to heat and cold, oxidation and mechanical agitation. It is preserved with salt, vinegar, spices, and, more recently, with lactic acid. The spices only play a minor part as preservatives, for mayonnaise is only delicately flavoured, and not much spice can be used. The principal problem is to preserve against rancidity and the emulsion against separation.

The chief among flavouring materials used to render our foods more palatable are the spices. Spices are more than flavours; many of them are antiseptics and are used for the preservation of food products and in the prevention of fermentation and toxemia. Spices are also stimulants to the digestion and appetite by reason of their pungency. Pepper holds its position as the most popular of all spices, because it combines its delightful aroma with sufficient "bite" to stimulate the flow of the digestive fluids through the entire digestive tract. Spices are classified as follows: (1) Simply aromatic, as anise, allspice, caraway, cardamom, celery seed, cinnamon, cloves, coriander, cumin, dill, fennel, mace, nutmeg, paprika, tumeric; (2) aromatic in odour and pungent in taste, as capsicum, ginger, pepper, yellow or white mustard; and (3) brown or black mustard, which is aromatic in odour and pungent in both odour and taste. The principal constituents of spices are their essential oils. Pepper contains phellandrene, piperin, dipentene, and caryophyllene; capsicum contains capsaicin; dill and caraway spices contain carvone and limonene; cinnamon contains cinnamic aldehyde.

Abstract of Paper read before the Society of Public Analysts on Wednesday, December 5, 1928

The Occurrence and Determination of Boron Compounds in Vegetable Products. By A. Scott Dodd, B.Sc., F.I.C.

Boron compounds were found in a large number of dried fruits and determined by a modification of Thomson's method, the results being confirmed colorimetrically. The amount of boron compounds (expressed as boric acid) found in dried raisins and currants ranged from 110 to 260 parts per million, and in miscellaneous dried fruits from 40 parts per million in prunes to 300 parts per million in apricots and peaches. In fresh fruits the quantities varied from 31 to 62 parts per million, corresponding to 280 to 550 parts per million on the dry substance.

Recipes

"Edinboro" Rock

THIS SWEETMEAT is undoubtedly one of the most popular and fascinating of "pulled" sugar goods. It is advantageously sold in various containers and packages. Cartons wrapped in the various tartan colours, with a view of the Scottish capital sealed on the top, are extremely attractive The smaller packages are wrapped in cellophane, or are sold loosely in glass jars.

There are three points which the manufacturer of this line has to bear in mind. Firstly, he has to make his colours bright yet delicate—this to catch the eye of the purchaser. Secondly, the proper amount of flavour—neither too weak nor too strong—is essential; it must be just sufficient to please the palate. Thirdly, a soft creaminess is required, so that the rock will readily melt in the mouth. Since each manufacturing confectioner has his own fancy as regards the colours and flavours for his goods, and since these vary so widely, it would not be advisable to give the amounts to be used in the following formulas, unless, of course, he could inform us as to the special brand he is using.

There are many formulæ for this kind of work: some include a little cornflour to insure mellowness, but the resulting product is not quite so sweet, and such a small amount is used that it is rather difficult to trace by the ordinary consumer. Also, since it is made without the old sugar and glucose formula, one must use an "invert" or "doctor" to make the batch workable; but, from experience, "glucose" as a "doctor" toughens and does not dissolve in the "eating properties" quickly, and naturally it is termed "common."

To begin with the formula: See that the pans and slabs and all utensils are perfectly clean, for the least sign of dust and dirt will soon show on the goods and spoil the whole effect.

Vanilla.

Now take

14 lbs. best granulated sugar.
½ oz. cream of tartar.
5 pints water.
½ oz. vanilla spirits.

Method.—Place the sugar and water in the pan and set on the steam or on open fire as the case may be, and continue to stir until it reaches the boil. Now take a fine skimmer to remove the scum that has risen on the molten syrup. Then proceed with the boiling, care being taken to wash down the sides of the pan, since any adhering dry sugar will set up a grain and spoil the batch. Then add the cream of tartar. Insert the thermometer, and when this registers 270° F., pour out on a cold and oiled slab. Do not fold in the batch until you can leave an impression made by pressing the finger into it. Add the flavour and colour just previous to folding, and knead it in a little, and pull over the hook until it becomes light and fluffy. Draw out into long strips of rolls to the usual standard thickness of half inch to one inch. When cold, cut into even lengths with shears. Place them on trays and store in a dry place until the following day, and when grained through they are then in a condition for packing and mixing with the remaining assorted colours and flavours.

Lemon.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
1 oz. citric acid (finely powdered).
3 drams lemon oil.
Yellow colour.

Proceed as for the Vanilla; add the acid and colour at the point of flavouring.

Cinnamon.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
Cinnamon oil—a sufficiency.
Orange colour.
A few drops of pink.

Proceed as for Lemon, leaving out acid.

Orange.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
1 oz. citric acid.
3 drams orange oil.
Orange colour.

Proceed as for Lemon.

Rose.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
1 oz. citric acid.
25 drops rose otto.
Pink colour.

Proceed as for Lemon.

Raspberry.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
1 oz. citric acid.
Raspberry essence—a sufficiency.
Carmine colour—a sufficiency.

Proceed as for Lemon.

Strawberry.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
1 oz. citric acid.
Strawberry essence—a sufficiency.
Pink colour—a sufficiency.
A few drops yellow—a sufficiency.

Proceed as for Lemon.

Pine-apple.

14 lbs. granulated sugar.
½ oz. cream of tartar.
5 pints water.
1 oz. citric acid.
Pine-apple essence.
Saffron colour.

Proceed as for Lemon.

Tripe Variations

By C. McLEAN

THE efficient cook can evolve quite a variety of attractive and appetising dishes from the humble tripe, especially suitable for people with weak digestion.

The tripe should first be washed under cold, running water, then placed in a saucepan containing cold water, brought to the boil, strained off, and fresh water added. Simmer gently for about three hours, after which the tripe is ready for using as desired.

Tripe Pie

The tripe for this should be allowed to jelly in the water in which it has been boiled. Line a pie-dish with pastry, and in this arrange small pieces of fat, uncooked bacon. Then place the tripe (which should be quite cold) over it, together with a little of the jellied gravy. Season liberally with salt and pepper. Add more pieces of bacon, and cover with more pastry, making a hole in the top to allow the steam to escape. Bake in a moderate oven until the crust is a light brown.

Stuffed Tripe

Place in a basin one cupful of breadcrumbs, one large onion finely chopped, a little sage, and a generous pinch of salt and pepper. Add a little milk and mix well. Pack this mixture into the tripe, fold over, and sew the edges together. Place in a baking tin, cover with some slices of fat bacon, and bake in a moderate oven for one hour. Pour over a little brown gravy, and serve with mashed potatoes.

Tripe and Bacon

Cut the tripe into thin strips about three inches wide. Place a piece of streaky bacon on each strip, sprinkle with chopped onion and parsley, then roll up and tie securely with thread or thin string. Place in a casserole. Cover with some well-seasoned stock, and cook very slowly. Mix a little milk with a teaspoonful of cornflour; add this to the sauce. Simmer five minutes.

Tripe Pasties

Mix together half pound warm, cooked potatoes and one egg, adding a little flour if the paste is too soft. Roll out to about half inch in thickness and cut into rounds with the lid of a large cocoa tin. Place a small piece of tripe on top of each round, sprinkle with pepper and salt, and fold over, pressing the edges firmly with the fingers. Fry in deep fat to a golden brown.

Enquiries

The following are extracts from letters we have lately received. We shall be glad to put interested parties in touch with the writers, or to insert replies in the Correspondence columns.

41. We make a potted fowl, and are endeavouring to increase the amount of extract which we get from the bones and skin of the fowls. Is there any recent contribution on the subject of cooking and digesting under pressure?

42. I would like to know how to make clear mint toffee.

Trade News

THE next meeting of the Lyons International Fair is to be held from March 4 to 17, 1929. Enquiries should be addressed to M. Jean Victor, 77a, Queen Victoria Street, London, E.C. 4.

* * *

The Board of the London Power Company have just placed orders for their new power station at Battersea for two turbo-alternators, each of which, with the house service alternators, will have a maximum continuous rating of 67,250 kw. (90,000 horse-power).

One of these turbo-alternators has been ordered from the British Thomson-Houston Company, Limited, Rugby, and the other from the Metropolitan-Vickers Electrical Company, Limited, Trafford Park, Manchester.

These sets, which are the largest yet ordered in Great Britain, will be manufactured at Rugby and Trafford Park, Manchester, respectively.

They are designed for high steam conditions, 570 lbs. per sq. in. gauge pressure, and a total steam temperature of 850° F., with feed heating system incorporated.

The alternators will be wound for 11,000 volts, 3 phase 50 cycles.

* * *

An interesting account of an accumulator-regulator with a large refrigerating capacity and covered by the Favier-Thibaud patents, will be given in next month's issue. This marks an important development in refrigerator practice. It is stated that by its use there is no possibility of condensation on foodstuffs. The Favier accumulator-regulator insures a permanent and constant radiation, and definitely regulates the hygrometric state.

Overseas News

Organization of the Swiss Dairy Industry

THE Central Union of Swiss Milk Producers has recently furnished the U.S. Department of Commerce with a report on the Swiss dairy industry which contains some facts concerning the canned milk industry in that country, which show that certain changes have taken place in the methods of administration of the industry which were not contained in the Trade Promotion Series bulletin which dealt with the international trade in condensed milk. These remarks, therefore, are published herewith as an amendatory description of the Swiss dairy industry to that contained in the above-mentioned bulletin.

According to information released by the special statistical committee of the Swiss Milk Commissioners, Swiss milk production is utilised as follows:

Form of Utilisation.	*Percentage.*		
	1924.	1925.	1926.
On Farms	31·6	31·3	32·0
As Fresh Milk	27·4	27·2	25·4
Cheese Factories	35·7	37·0	37·8
Condenseries	3·5	3·8	4·2
Exported Fresh State ...	1·8	0·7	0·6

Less than one-half of the total Swiss production of Swiss milk manufactures is exported. During the year 1926, 40 per cent. of the cheese production, less than 1 per cent. of the butter production, and 84 per cent. of the condensed milk production was exported.

During the World War the Swiss Government took part in the price control and distribution of the products of the Swiss dairy industry. To-day, however, the price which the milk producer receives in Switzerland is fixed relatively by the Central Union of Dairy Farmers through a guarantee of the price of cheese. In other words, the Union guarantees to purchase the entire production of the cheese manufacturer at a fixed price. The cheese manufacturer, knowing that he will be able to dispose of his output at a specified price, is warranted in offering a certain price to the local central collection station, and thus to the producer. The price which the producer receives, therefore, varies only with respect to the cost of transportation to the cheese manufacturer. This variation is naturally small, for, if no large cheese manufacturer is located in the immediate neighbourhood, the local central assumes the rôle of manufacturer.

This system of guaranteeing the price of milk through the price of cheese eliminates to a very large extent any tendency of other milk-consuming industries to attempt to purchase at a price lower than the standard. If, for example, the condensed milk industry refuses to pay the standard price, the producers, through their local centrals, will turn their milk into cheese where the standard price can be obtained. If, on the other hand, the condensed milk industry is greatly in need of the milk, it may pay a premium in order to turn a greater quantity away from the cheese industry. The same situation is true in other milk-consuming industries. Therefore, the producer is not bound by a fixed price; he is merely guaranteed a minimum price for his output. By guaranteeing the price of approximately one-third of the milk production, the minimum price of the other two-thirds is automatically regulated, inasmuch as the cheese industry is obliged to take care of any surplus production.

The producer makes no guarantee to supply fresh milk to the cheese, canned milk and chocolate industries in the order of their relative importance. The Central Union of Dairy Farmers has assured the government that a sufficient supply of fresh milk will be retained for domestic consumption. Aside from this agreement, which practically takes care of itself, the other milk-consuming industries compete among themselves for the surplus, with the cheese producers bound by their agreement with the farmers to take all overproduction.

The supply of milk for canning and confectionery is relatively stable, depending on the market demand for these products. The supply of milk for consumption as such is practically constant with the cheese industry providing the ever-changing factor. If a shortage in the domestic fluid milk supply threatens, the Central Union of Dairy Farmers through its organisation restricts fresh milk exportation in such amounts as may appear to be necessary.

Swiss Canned Milk Industry during First Half of 1928

The production of canned milk in Switzerland during the first half of 1928 is estimated at 20,000 short tons, according to a report of October 1 from C. W. Cannon, at Zurich. It is almost completely a production for export, and conditions in the export market, therefore, influence to a certain extent the rate of production. There is considerable anxiety concerning present conditions due to the increased prices effective last April. The trade considers it certain that the present year's export, and consequently the production, will be less than last year's, notwithstanding the favourable development in the first three months of the year.

Dairying is an important agricultural pursuit in Switzerland. There are approximately 875,000 cows in the country, and the domestic production of fresh milk for the first six months of the year is estimated at 1,500,000 short tons. It is claimed in some circles that there is an overproduction of milk; in any case, as far as the canned milk industry is concerned, the supply of fresh milk would warrant considerable expansion.

Until the current year powdered milk exports were included in the figures for canned milk. They now make up a separate category along with infants' food, special flours, etc., thus in part accounting for the reduced canned milk exports. The volume of powdered milk trade, however, is so small as to be without significance, now amounting, according to an export estimate, to only some £8,000 yearly.

An even half of the total Swiss canned milk exports during the period under review went to the Straits Settlements, Indo-China, the Dutch Indies, Burma, and Siam. About 30 per cent. of the total was credited to the Straits Settlements alone. England, with a contingent of about £133,000, absorbed 17 per cent. of the total. Exports to France, about 6 per cent. of the total, amounted to about £47,000.

There is no fixed export price, as competition and market conditions in various parts of the world necessitate some variation in the prices quoted different destinations.

The Swiss people are accustomed to fresh dairy products, and the supply of fresh milk is both plentiful and of good quality. The local market for canned milk is, therefore, very limited. It is stocked by stores throughout the country, however, and a certain class of household prefers canned milk. There is also a considerable consumption of canned milk during the rush season in tourist centres, where the fresh milk supply is limited.

The volume of Swiss export trade in canned milk is shown by the following table:

SWISS CANNED MILK EXPORTS.

Year.	*Short tons.*	*Value (approximate).*
1913	44,614	£1,704,000
1922	22,690	£1,111,000
1923	27,855	£1,232,000
1924	29,051	£1,380,000
1925	33,707	£1,576,000
1926	36,893	£1,579,000
1927	40,533	£1,709,000
1928 (6 months)	19,195	£827,000

Japanese Milk Firm to Merge with Nestlé in Japan

Dai Nippon Nyuseihin Kaisha, or Dai Nippon Condensed Milk Company, Ltd., of Sapporo, Hokkaido, has entered into a business agreement with Nestlé and Anglo-Swiss Condensed Milk Company, of Switzerland, according to a recent report received from H. A. Butts, of Tokyo. As the result, a new company styled Dai Nippon Condensed Milk and Nestlé Company, is to be incorporated on the basis of the Dai Nippon Company. The new company will be capitalised at 4,000,000 yen (approximately £400,000) with paid in capital of 3,000,000 yen. The old company is capitalised at 1,000,000 yen, with paid-in capital of 662,500 yen. The Nestlé Company will take two-thirds of the total shares in the new company and the shareholders of the Dai Nippon Company one-third.

The new company will erect a factory on a piece of land covering 83,000 square feet at a cost of 1,000,000 yen, with a view to producing 300,000 cases a year. Work will be commenced soon. Of the production, about 130,000 cases are to be sold in Japan proper, 20,000-25,000 cases to Chosen and Manchuria, and the remaining cases to other Oriental markets. It is said that the new company is to obtain, in case of necessity, working capital from the Swiss company within the limit of 5,000,000 ven at an interest.

Commercial and Legal News

New Companies

CHAS. OLDHAM AND SON (WISBECH), LIMITED. (234677) Regd. November 9, 1928. To take over the bus. of mineral water mnfrs. cd. on at Victoria Works, Victoria Road, Wisbech, Cambs., as "Chas. Oldham and Son." Nom. Cap.: £500 in £1 shares.

FARM TO CONSUMER, LIMITED. (234683) Regd. November 9, 1928. 534, High Road, Streatham, S.W. 16. To carry on the bus. of dlrs. in and purveyors of eggs, butter, milk, poultry, etc. Nom. Cap.: £1,000 in £1 shares.

PURSALL AND COMPANY, LIMITED. (234761) Regd. November 12, 1928. To carry on the bus. of confectioners, sugar mchts., etc. Nom. Cap.: £6,000 in £1 shares (1,000 pref. and 5,000 ord.).

M. SAPER, LIMITED. (234783) Regd. November 13, 1928. 5, 7, and 9, White Lion Street, E. 1. To carry on the bus. of mnfrs. of confectionery, sugar millers, and brokers, provision dlrs., etc. Nom. Cap.: £4,000 in £1 shares.

MACARTHUR'S PURE FOOD COMPANY, LIMITED. (234806) Regd. November 14, 1928. 26, Ludgate Hill, E.C. To take over the bus. of a dlr. in patent and other food products, etc., cd. on at Springfield Terrace, Harrow, as the Ideal Health Food Stores. Nom. Cap.: £1,500 in £1 shares (900 ord. and 600 pref.).

CHOCOLATE PRODUCTS COMPANY, LIMITED. (234863) Regd. November 16, 1928. 45 and 46, Fetter-lane, E.C. 4. To carry on the bus. as indicated by the title. Nom. Cap.: £3,000 in £1 shares.

GOAMAN AND SON, LIMITED. (234870) Regd. November 16, 1928. To take over the bus. of a grocer and provision and genl. mcht. cd. on at Bideford and elsewhere by W. T. Goaman. Nom. Cap.: £10,000 in £1 shares (5,000 pref. and 5,000 ord.).

T. AND C. (MON.), LIMITED. (234887) Regd. November 16, 1928. To carry on the bus. of wholesale and retail grocers and provision mchts., etc. Nom. Cap.: £750 in £1 shares.

W. JEFFERY (PROVISIONS), LIMITED. (234890) Regd. November 16, 1928. To take over the bus. cd. on at 187, Uxbridge Road, W., as "William Jeffery," and to carry on the bus. of grocers and provision mchts., etc. Nom. Cap.: £500 in £1 shares.

THOS. SKELTON AND COMPANY, LIMITED. (234917) Regd. November 17, 1928. 93, East Lane, Bermondsey Wall, S.E. To carry on the bus. of millers, flour factors, and genl. traders, etc. Nom. Cap.: £10,000 in £1 shares.

WILTSHIRE EGG PRODUCERS, LIMITED. (234922) Regd. November 17, 1928. Eddington, Hungerford, Berks. To carry on the bus. of egg mchts. and dlrs. in poultry formerly cd. on at Ramsbury, Wilts., by J. McLaren. Nom. Cap.: £10,000 in £1 shares.

RE-AL PRESERVES, LIMITED. (234997) Regd. November 21, 1928. To take over the bus. of jam mnfrs. cd. on at The Jam Factory, Bromyard Road, Ledbury, Herefordshire, by "Re-al Preserves." Nom. Cap.: £1,000 in £1 shares.

"GROATEN," LIMITED. (235020) Regd. November 22, 1928. 6 and 7, Broadmead, Bristol. To take over the bus. of marketing and selling a cereal foodstuff known as "Groaten," cd. on as part of its bus. by Chamberlain Pole and Company, Limited, at Broadmead, Bristol; to purchase the trade marks incorporating the word "Groaten," etc. Nom. Cap.: £10,000 in £1 shares.

J. W. THOMPSON (CHESTERFIELD), LIMITED. (235115) Regd. November 26, 1928. Hill House, Old Whittington, Chesterfield, Derbyshire. To take over the bus. of a baker and confectioner cd. on at Whittington, Chesterfield, Derbyshire, and elsewhere, as "J. W. Thompson." Nom. Cap.: £5,000 in £1 shares.

R. SCOTT AND SONS, LIMITED. (235127) Regd. November 26, 1928. 35, St. James Street, Liverpool. To take over the bus. of master bakers and flour dlrs. cd. on at Upper Beau Street, Liverpool, as "Robert Scott and Sons." Nom. Cap.: £6,000 in £1 shares (2,000 pref. and 4,000 ord.).

GENERAL BAKERY CORPORATION, LIMITED. (235207) Regd. November 29, 1928. To carry on bus. as bakers, etc. Nom. Cap.: £100 in £1 shares.

WHITEWELL DAIRIES, LIMITED. (235271) Regd. December 1, 1928. Park Street, Accrington. To carry on the bus. indicated by the title. Nom. Cap.: £2,000 in £1 shares.

London Gazette Information

TRADE BOARDS ACTS, 1909 AND 1918.

FIXING OF MINIMUM RATES OF WAGES IN THE MILK DISTRIBUTIVE TRADE IN ENGLAND AND WALES.

The Milk Distributive Trade Board (England and Wales) have issued a Notice, dated November 23, 1928, setting out Minimum Rates of Wages as fixed by them and confirmed by an Order of the Minister of Labour, to take effect as from November 26, 1928, for those classes of workers newly brought within the scope of the Trade Board by the Trade Boards (Milk Distributive Trade, England and Wales) (Constitution and Proceedings) Regulations, 1928, together with the Minimum Rates which are already in force under Orders of which previous notice has been given.

Information with regard to the Minimum Rates of Wages operative in the trade under the Trade Boards Acts may be obtained on application to the Secretary, Milk Distributive Trade Board (England and Wales), 1, Whitehall Gardens, London, S.W. 1.

IN PARLIAMENT

(SESSION 1928-29.)

CORN EXCHANGE COMPANY.

Application is intended to be made to Parliament in the present Session by the Corn Exchange Company (hereinafter called "the Company") for leave to introduce a Bill of which the principal subject matters are:

Transfer to and vesting in the Company of the undertaking of the London Corn Exchange Company (hereinafter called "the London Company") and dissolution of that Company; Issue of capital stock or other securities of the Company and payment of cash in certain cases to holders of shares of the London Company in substitution for those shares; Ranking of, dividends on, and rights of holders of such substituted securities; Transfer of such substituted securities and payment of such cash into Court in certain cases; Provision as to debts and liabilities of, monies due or accruing due to, funds of, and obligations and liabilities of the London Company and as to directors, auditors, officers and employés of the London Company.

Amalgamation of the Corn Exchanges in Mark Lane in the City of London belonging to the Company and the London Company respectively (hereinafter referred to as "the old Exchange" and "the new Exchange") and maintenance and user of both Exchanges as one Exchange (hereinafter called "the amalgamated Exchange"); Exercise by the Company with respect to the amalgamated Exchange and the site and buildings thereof and other lands and buildings of the Company or the London Company and persons resorting thereto of all or some of the rights, powers and privileges of the Company under the Corn Exchange Act 1872 and the Corn Exchange Act 1914 or now exercisable by the London Company under the London Corn Exchange Act 1826 and the London Corn Exchange Act 1917.

Alteration, adaptation, etc., of buildings comprising or connected with the old Exchange or the new Exchange and other buildings of the Company and the London Company and of means of communication and access between such buildings or the sites of said Exchanges; Construction of new means of communication and access.

Extension of purposes for which the amalgamated Exchange may be used and enlargement of objects of the Company.

Power to close the amalgamated Exchange on certain days.

Regulation and control by the Company of the amalgamated Exchange and the buildings lands and property of the Company and of the user thereof and of persons resorting thereto and of the business transacted therein and powers for preventing unauthorised user, nuisances and obstructions; Bye-laws; Application of bye-laws to, payments by, and other provisions as to, buyers.

Acquisition by agreement, sale, leasing, etc., and user of lands, buildings, easements, etc.; Alteration, demolition, erection, etc., of buildings.

Application of funds, additional capital, redeemable capital, and other financial provisions.

Directors, auditors, voting, registers, pensions, etc., and other administrative provisions.

Incorporation, repeal, amendment, extension and application of Acts, etc.

Printed copies of the Bill will be deposited in the Committee and Private Bill Office of the House of Commons on or before December 17, 1928, and on and after December 21, 1928, a copy of the Bill may be inspected and copies may be obtained at the price of three shillings and sixpence per copy at the offices of the undermentioned Solicitors and Parliamentary Agents.

A Notice stating more fully the objects of the Bill has been or will be published in the *Times* of November 20 and 27 instant.

Dated this 20th day of November, 1928.

DRUCES AND ATTLEE, 10, Billiter Square, E.C. 3, Solicitors for the Bill.
REES AND FRERES, 7, Victoria Street, Westminster, S.W. 1, Parliamentary Agents.

Joint Stock Companies.

At the expiration of three months, the names of the undermentioned companies will, unless cause is shown to the contrary, be struck off the Register, and the companies will be dissolved:

Absopure Milk Supply Company, Limited.
Amalgamated Clubs Brewery Company, Limited.
Anglo-Dutch Trading Company (Amsterdam, Holland), Limited.
British Liqueurs, Limited.
Castell del Remey Wine Company, Limited.
Hotel, Restaurant, and Club Supply Company, Limited.
Grison's Pure Oats Cocoa Company, Limited.
Heabisk Biscuit Company, Limited.
Mutscat Wine Company, Limited.
Costa Rican Coffees (Bristol), Limited.
Farmers Dairies (Willesden), Limited.
Prickly Pear Products Proprietary, Limited.
South Irish Milk Company, Limited.
Sonia Biscuits (Birmingham), Limited.
Walkden and District Farmers' Milk Supply Association (1921), Limited.
White and Company (Food Products), Limited.

Reduction of Capital.

BOVRIL AUSTRALIAN ESTATES, LIMITED, and Reduced. The Order of the High Court, Chancery Division, dated December 3, 1928, confirming the reduction of the capital of this company from £255,000 to £98,348, and the minute approved by the court showing with respect to the share capital of the company, as altered, the several particulars required by the Act, were registered by the Registrar of Companies on December 8, 1928.

Voluntary Liquidations.

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

DAIRY PRODUCTS, LIMITED. Resolved, December 7, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. W. Lund, of Messrs. Walter Lund and Plunkett, Accountants, of Mornington Chambers, 235, Manningham Lane, Bradford, be appointed liquidator.

NEWFOUNDLAND FISH PRODUCTS, LIMITED. Resolved, December 12, that the company be wound up voluntarily, and that Mr. H. Cossins, Chartered Secretary, 835, Salisbury House, London Wall, E.C., be appointed liquidator.

BLUE DIAMOND ICE-CREAM COMPANY, LIMITED. Resolved, November 23, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. L. J. Cozens be appointed liquidator. Claims should be sent to the liquidator at 8, East Stockwell Street, Colchester, by January 3, 1929.

GLEN LORNA TEA COMPANY, LIMITED. Resolved, November 14, that the company be wound up voluntarily, and that Mr. C. T. Wale and Mr. C. Meredith, both of 17, St. Helen's Place, E.C. 3, be appointed liquidators for the purpose of such winding-up at a remuneration of £150.

COURTENAY'S WORCESTERSHIRE SAUCE SYNDICATE, LIMITED (in voluntary liquidation). A General Meeting of the members of this company will be held at the offices of Messrs. Harry Day and Company, 51, Foregate Street, Worcester, on January 5, 1929, at 11 am., to receive the report of the liquidator showing how the winding-up of the company has been conducted. Liquidator, Mr. G. W. Bull.

Legal News

The Editor and Proprietors of FOOD MANUFACTURE *do not accept responsibility for any errors which may occur in the following Law Reports.*

In the Chancery Division on December 10, Mr. Justice Romer heard an action by the Douglas Packing Company (Inc.) and the Certo Corporation, both of Rochester, New York, against William Evans and Company (Hereford and Devon), Limited, of Widemarsh, Hereford, for an injunction to restrain alleged infringements of patents for improvements relating to the manufacture of jam and jelly. The defendants denied the infringement alleged, and contended that the patent sued upon was invalid.

Mr. Whitehead, K.C., for the plaintiffs, said that the patents related to jellymaking. For jam or jelly three things were necessary: (1) Pectin; (2) fruit acid; (3) sugar. Pectin was itself obtained from fruit, and patent 12439 of 1913 was for depriving the pectin concentrates of their natural sugar so that they would keep without jellification and could be used to produce jellification in fruits that contained the least pectin, such as strawberries. The invention revolutionised the jam and jellymaking industry. The second patent sued upon—6497 of 1915—was for removing starch from the pectin extracts.

William Ashton Bender, chief chemist to the plaintiffs, gave expert evidence. He said that up to 1914 the sales amounted to 23,000,000 dollars, and they were now increasing at the rate of 3,750,000 dollars a year. As against a price of £2 a case in 1917, the present price was about 30s. Before plaintiffs' pectin concentrates there was no such article on the market either in this country or America.

Mr. Bender (continuing his evidence on behalf of the plaintiffs) said he could tell by analysis that defendants' concentrates were obtained from apples.

Mr. Moritz, K.C., for defendants: There is no dispute that it is made from apples. It is made in accordance with the statement we have sworn to.

Mr. Cripp, K.C., for the plaintiffs: My lord, that is impossible.

Mr. William Ashton Bender, chemist to the plaintiff company continued his evidence. This was his third day in the witness box, and the clerk of the court was surrounded by bottles of a gum-coloured liquor produced by the witness as examples of pectin concentrates made from apples by the plaintiffs' process.

Mr. Bender stated that from year to year variations in the quantity of the pectin contained in fruit reached as much at 25 per cent. From season to season the quality of the pectin (which gave fruit its jellifying qualities and which was extracted by the patented process in order to promote jellification in fruits which only jellied with difficulty) did not vary much. In America, England, or France the pectin in the fruit of each country was fairly constant in quality from season to season. But there were wide differences in quality as between different regions even in the same season. Regional differences in this respect were as high as 15 per cent.

Mr. Cripps, K.C., for plaintiffs, said that plaintiffs' chief chemist, Mr. Bender, desired to return to America for a few weeks.

His lordship stated that he would adjourn the hearing until February 5.

Mr. Cripps, summing up the case for the plaintiffs, said that prior to his clients' patent there was no pectins concentrate on the market. Immediately this article was put on the market there was a very large sale. In the first year enough was sold to make a million pounds of jam. Altogether, the sales were sufficient to make nearly 2,000,000,000 pounds of jam. If the invention was obvious it was astonishing that no one else had thought of it.

Mr. Moritz, K.C., for the defendants, said plaintiffs admitted that without concentration there could be no infringement. Defendants never concentrated their products. Before plaintiffs' patent a practical manufacturer and a lady writing for practical manufacturers disclosed to the world that they had made and could make pectous juices. What plaintiffs had done was to discover that these could be boiled down. That was not a patentable invention.

* * *

In the case of Hovis, Limited, *v.* Express Dairy Company, Limited, a motion to restrain defendants from alleged infringement of the trade mark Hovis by selling bread which is not Hovis, was mentioned by Mr. Justice Maugham in the Chancery Division on December 14. As defendants wanted to file evidence in reply to plaintiffs' allegations, the motion stood over, the Express Dairy Company giving an undertaking in the interim in the terms of the notice of motion.

(*Continued from next page.*)

ments of Cacao Beans and Cocoa Products. Ash Content of Cocoa Paste. H. Fincke. (*Z. Unters. Lebensm.*, 1928, 55, 559-566, 567-568.)

43. Dextrins of Honey and Artificial Honey. J. Fiehe and W. Kordatzki. (*Z. Unters. Lebensm.*, 1928, 55, 602-608.)

44. Chemistry and the Canning Industry. W. D. Bigelow. (*Ind. Eng. Chem.*, 1928, December, 1286-1289.)

45. Chemistry and the Beverage Industry. F. M. Boyles. (*Ind. Eng. Chem.*, 1928, December, 1289-1292.)

46. Chemistry and the Cocoa and Chocolate Industry. F. C. Gephart. (*Ind. Eng. Chem.*, 1928, December, 1295-1297.)

47. Chemistry and the Flavouring Extract Industry. B. H. Smith. (*Ind. Eng. Chem.*, 1928, December, 1307-1309.)

48. Relation of Chemistry to the Spice Industry. J. Glassford. (*Ind. Eng. Chem.*, 1928, December, 1316-1318.)

49. Chemistry and Food Regulation. P. B. Dunbar. (*Ind. Eng. Chem.*, 1928, December, 1320-1322.)

50. Research in the Confectionery Industry. H. S. Paine. (*Ind. Eng. Chem.*, 1928, December, 1325-1327.)

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51. Detection of Excessive Quantities of Husk in Cocoa and Cocoa Preparations. J. Grossfeld and A. Simmer. (*Z. Unters. Lebensm.*, 1928, 55, 553-559.)

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1. Fruit Juices and Fruit Juice Beverages.—Part IV. J. H. Irish. (*Fruit Prods. Jour.*, 1928, November 12-14.)

2. Apple By-Products and Cull Utilisation. C. R. Fellers. (*Fruit Prods. Jour.*, 1928, August, 10-12.)

3. Economic Aspects of the Pear Industry. S. W. Shear. (*Fruit Prods. Jour.*, 1928, August, 13-16.)

4. Automatic Control of the Carbonation Process in Beet Sugar Manufacture. R. T. Balch and J. C. Keane. (*Ind. Eng. Chem.*, 1928, November, 1148-1151.)

5. Determination of Solubility of Sucrose in Beet House Syrup. R. J. Brown, J. E. Sharp, and H. W. Dahlberg. (*Ind. Eng. Chem.*, 1925, November, 1230-1232.)

6. Sugar Cane Varieties in Cuba. F. S. Earle. (*Planter and Sugar Manufr.*, 1928, November 24, 405-406, and December 1, 424-425.)

7. Heat Transfer Determinants of Bottle Pasteurisation of Fruit Juices. K. L. Ford and A. G. Osborne. (*Glass Container*, 1928, November, 7-8.)

8. Evaluation of Potatoes According to the Starch Content. E. Parow. (*Z. Spiritusind.*, 1928, 51, 209.)

9. Determination of Starch in Potato Pulp. C. von Scheele and G. Svensson. (*Z. Spiritusind.*, 1928, 51, 290-291.)

10. Variations of the Manganese Content of Certain Vegetables. W. H. Peterson and C. W. Lindow. (*Soil Sci.*, 1928, 26, 149-153.)

11. Chemistry and the Preserve, or Jam and Jelly Industry. C. P. Lathrop. (*Ind. Eng. Chem.*, 1928, December, 1298-1301.)

12. Relation of Chemistry to Citrus Products Industry. C. P. Wilson. (*Ind. Eng. Chem.*, 1928, December, 1302-1307.)

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13. Some Oxidising Effects of Flour Bleaching. E. B. Working. (*Cereal Chem.*, 1928, 5, 431-435.)

14. Determination of Moisture in Wheat and Flour. "Moisture Testing" in Water Ovens and Electric Ovens. E. A. Fisher and C. R. Jones. (*J. Agric. Sci.*, 1928, 18, 649-670.)

15. Criteria of the Validity of Analytical Methods used by Cereal Chemists. A. E. Treloar and J. A. Harris. (*Cereal Chem.*, 1928, 5, 333-351.)

16. Disintegration of Rice Straw. H. Iwata. (*J. Dep. Agric.* Kyushu, 1926, 1, 217-240.)

17. Chemistry and the Baking Industry. C. B. Morison. (*Ind. Eng. Chem.*, 1928, December, 1292-1294.)

18. Chemistry and the Shortening Industry. M. B. Graff. (*Ind. Eng. Chem.*, 1928, December, 1309-1312.)

19. Chemistry and the Breakfast-Food Industry. W. S. Hilpert. (*Ind. Eng. Chem.*, 1928, December, 1318-1319.)

20. The Service of Chemistry to the Milling Industry. C. O. Swanson. (*Ind. Eng. Chem.*, 1928, December, 1322-1324.)

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21. Composition of Sheep's Milk. R. Martin. (*Ann. Falsif.*, 1928, 21, 390-397.)

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23. Potentiometric Determination of Chlorine in Milk. C. Rohmann. (*Z. Unters. Lebensm.*, 1928, 55, 580-590.)

24. Determination of the f.p. of Milk. P. Weinstein. (*Z. Unters. Lebensm.*, 1928, 55, 590-602.)

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26. Butter-Fat Tests on First and Later Lactations. C. F. Monroe. (*Ohio Agric. Exp. Sta. Bull.*, 1927, No. 12, 34-38.)

27. Detection of Thickening Agents in Whipped Cream. O. Baumann. (*Z. Unters. Lebensm.*, 1928, 55, 577-580.)

28. Chemistry and the Dairy Industry. G. E. Holm. (*Ind. Eng. Chem.*, 1928, December, 1312-1315.)

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29. Malt Vinegar and its Manufacture.—Part I. P. Hassack. (*Fruit Prods. Jour.*, 1928, November, 19-20.)

30. Economical Vinegar Production in a Plant of Moderate Capacity.—Part II. L. B. Lawyer. (*Fruit Prods. Jour.*, 1928, November, 16-18.)

31. Precooling as Applied to CO_2 Refrigerating Machines. (*Ice and Refrigeration*, 1928, November, 365-369.)

32. Canned Meats. C. L. Rowe. (*Sheet Metal Industries*, 1928, November, 281-283.)

33. Report of Minnesota Testing Mill for 1926. R. C. S. Sherwood. (*Bull. 62, Minnesota State Dept. of Agric.*, May, 1928.)

34. Influence of Soil Moisture Variations on Cost of Canning Tomatoes. R. E. Brooks and J. H. MacGillivray. (*Canning Age*, 1928, August, 679-682.)

35. Incomplete Sterilisation of Food Products Due to Heavy Syrup. O. Rahn. (*Canning Age*, 1928, August, 705-706.)

36. Raw Materials of the Marshmallow Batch. F. R. Johnson. (*Manuf. Confr.*, 1928, November, 38-41.)

37. Cannery Waste Treatment in Wisconsin. L. F. Warrick and W. U. Gallaher. (*Canner*, 1928, December 1, 15-18.)

38. Nutritional Aspects of Canned Foods. E. F. Kohmans. (*Canner*, 1928, December 1, 25-26.)

39. Use of Starch for Characterisation of Margarine. E. Vitoux. (*Ann. Falsif.*, 1928, 21, 420-424.)

40. The Formol Tests for Distinguishing Artificial from Natural Foodstuffs. H. E. Hill. (*Chem. Eng. and Min. Rev.*, 1928, 20, 401-402.)

41. Kilning of Malt. R. Schlenk. (*Woch. Brau.*, 1928, 45, 415-418, 426-430, 451-456.)

42. Cacao Beans and Cocoa Products, V. Pig-

(*Continued on previous page.*)

Recent Patents

These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

34762. TARBET, W. G.: Method of pasteurising milk, etc. November 26.

34991, 34992, 34993. AKTIEBOLAGET SEPARATOR: Cooling milk, etc. November 27.

35301. KENNEDY, D.: Treatment of coffee. December 30.

36045. BENTALL, L. G.: Apparatus for feeding coffee cherries, etc., to pulping machines, etc. December 6.

36046. BENTALL, L. G.: Apparatus for pulping cherries, etc. December 6.

Specifications Published

295,648. LINDNER, P.: Fermenting cane sugar, glucose, and fructose.

300,537. FISHER E. A., AND JONES, C. R.: Manufacture of flour.

300,859. ORR, W. G.: Devices for blending and mixing liquids, dissolving powders, beating eggs, and like purposes.

396,704. SAVY, E.: Machines for glazing or coating sweetmeats, biscuits, and the like.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts Published

293,066. **Extracting Sugar.** FARNELL, R. G. W., 14, Cardinal Mansions, Carlisle Place, London.

Dried beet cossets are extracted with water under reduced pressure and at a temperature below 100° C., preferably at a temperature between 50° and 60° C. The pressure during extraction may be varied.

293,237. **Bottle closures.** SMITH, L. L., 28, Willes Road, London.

Disc closures; making capsules and stoppers.—A cardboard closure disc having an incomplete outline of a circular or other aperture cut in it to provide a flap is forcibly impregnated with wax on both sides to impregnate the cut borders of the flap and aperture. The impregnation may be effected by passing the cut discs between blanket covered rollers which pick up wax from a molten bath thereof.

293,268. **Closures for bottles.** RAWORTH, J. E., 75, Victoria Street, Westminster.

Capsules and like closures.—In a fibrous cap for glass bottles, etc., the securing portion of the skirt is impregnated with sulphur which solidifies within and combines with the fibres in the portion. The caps are dipped in molten sulphur to coat them therewith and are maintained at a temperature substantially higher than the melting-point of sulphur to cause the sulphur to impregnate the material. The sulphur is then allowed to cool. Before applying the cap to the neck of a bottle, it is heated to melt the sulphur, whereupon it is applied hot to the bottle and moulded beneath the shoulder thereof. On cooling, the cap sets to a rigid form.

293,342. **Oils and fats; emulsions, making; packing; food for animals.** NYROP, A., 11, Lyngbyvej, Copenhagen.

Raw vegetable oil-containing substances are brought to a non-meltable paste or powder to facilitate transport by treatment in water or watery solution with a film-producing material—*e.g.*, carbohydrate or albuminate—which, if not present, is added, in an emulsifier or homogeniser, and spray-drying the product. Copra, or the pericarp of oil-palm, may first be ground in water, and the oil centrifugally separated, homogenised, and spray-dried to a powder. The film-producing may be added, if necessary, after dispersion of the oil-containing substances in water, which is either present in the substance or added. The residue may be used as animal fodder.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

VELO

490,990. **Preparations in Class 42 for thickening gravies.** SMITH, HUGHES, AND COMPANY, LIMITED, 23, College Hill, London, E.C. 4. December 12.

CREMONGE

493,787. **Blanc-mange powders and blanc-mange crystals.** W. H. SMITH AND SON, Strand House, Portugal Street, London, W.C. 2. December 12.

REEL

494,550. **Gravy salt (for food).** S. WATERHOUSE, LIMITED, 15, Russel Street, Sheffield. December 12.

MARGOL

495,970. **Edible fats.** JOSEPH CROSFIELD AND SONS, LIMITED, Bank Quay, Warrington. December 5.